
Field Commander
A Real Time Strategy System
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Contents

Intent Statement

By creating a first person, real time unit movement system, where players use magnified optics to select units and place markers for them in the game world, I intend to create an experience that focuses on strategic positioning and intelligence gathering as players must think about their own tactical position as well as their units' positions as they reveal enemy locations on an in-game map.

Research, Thesis, & Process

My goal is to create a strategic unit management & information gathering system which revolves around the player revealing enemy locations on a map by taking into account the position of their own avatar in relation to the positions of their units rather than the traditional "overhead view" seen in the majority of unit-based strategy games. The main objectives with this system are to **make the player consider their own position** on a moment to moment and strategic basis just as much as they consider their units' positions, **provide an adequate yet unobtrusive interface** to give players the information they need from long distances, **relay tactical information** directly from and only from the player's units, and to **instill uncertainty** about the players' opponents and objectives, as the map is obscured by a fog of war and must be revealed by moving the units.

The majority of turn based and real time strategy games with unit management and movement systems simply provide the player with a "god like" overhead view of the map as they act as a sort of "battle commander" or "leader," which is a useful design choice for showing lots of important information at once. However, often in real life military situations, unit commanders, sometimes called "field commanders," obviously do not have this perspective on the battlefield and can only know what their troops and scouts report to them. This idea was the original inspiration for my system; I wanted to replicate the feeling of being a field commander overseeing a small number of troops from a position with a limited perspective on the field itself, with most tactical information being relayed directly to the commander by their units.

To do this, I planned to give the player a first-person avatar that can move around, use a scope to oversee their units from afar, select units when looking at them through the scope, and place markers in the world for them to travel to. Additionally, to instill uncertainty, I aimed to cover the game world with the classic "fog of war" that can be cleared by units as they move throughout the world. Players are also given a physical map in their command area that shows the level terrain and also has fog of war which is cleared as units move to give the feeling of units reporting information to their commander. Lastly, to give the player an objective to use

these mechanics with, I aimed to make the context more focused around controlling scouts rather than soldiers, as the main goal of players is to identify the locations of all of the enemies in the game world by marking them on the map with the units.

After brainstorming these mechanics for the system and thinking about its implementation, I decided to begin my research by looking into how unit movement systems in strategy games relay information to the player and how units are controlled. I deconstructed one of the most popular strategy games available; *Civilization V*. While Civ V is a turn-based game and my system is real time, I chose to look at how it handles movement regardless. While deconstructing the game, I came to notice that the unit interaction systems were effortless and natural to use and instantly provided the player with any information they needed about a unit the second they clicked on it, from health points to movement radius and so on. I also noted how important the fog of war mechanic was to strategy formulation, since the uncertainty it provided made revealing the map a key part of the strategic process in the early and middle game. I used what I learned from this deconstruction to inform the control scheme of my system, how players would know which unit was selected, and how to make fog of war a key part of strategic gameplay.

With the deconstruction of Civ V complete and influence from it gained, I began to realize that I would have to design a very clear and easy to use yet unobtrusive user interface if this system was going to succeed. Players would need to know exactly where their units were since they may not always be able to see them directly and would have to move around to do so. While I have some experience designing user interfaces for games, it is not my specialty or area of focus and is a great challenge to me. To tackle this challenge, I decided to research the principles of good user interface and user experience design. I ended up finding a great article called "Game UI By Example: A Crash Course in the Good and the Bad." This article gave a lot of great examples of good and bad user interfaces and explained several guiding principals for UI design. Perhaps the biggest influence I had from this article was the idea that the interface should tell players what they need to know as soon as possible in a clear, concise way, and then leave the player alone. This takeaway inspired the interface design of the "beams of light" that come up from units and the markers in the world to indicate which unit is selected, where the player's scope is pointing to place a marker, and the locations of placed markers that units are currently moving to. I found this to be a simple solution to the problem since the beams can always be seen no matter the player's distance and the different colored beams relay different types of information.

With an idea for an interface now designed, I wanted to get some ideas about how to keep players focused on the strategy and tactics of the gameplay without getting overwhelmed by too many units to handle and micromanage. I did some research into the area of unit management design and found a great article on Gamasutra called "Too Many Clicks! Unit-Based Interfaces Considered Harmful." The article discusses how many strategy games

overwhelm the player with too many units that all have to be clicked on individually and assigned orders with clicks, which takes away from strategy and makes the game more about clicking speed. An interesting concept called the Rule of Seven is discussed at length in the article as well. It means that having control over more than seven entities at once causes frustration and an overreliance on micromanagement, which is a sign of flawed interface design. With this knowledge in mind, I designed the unit movement mechanic to require as few clicks as possible to prevent overwhelming amounts of micromanaging; one click to select, one click to place a marker. The units do the rest and automatically move to the marker, meaning the player doesn't have to worry about clicking on every individual waypoint in the path that they want their unit to follow.

Lastly, I wanted to learn more about the uncertainty provided by the "fog of war" mechanic and successful ways to implement it with the limited perspective of a first-person view. I scoured articles looking for information about uncertainty and fog of war pertaining to game design and came across an article tailored towards board games but very useful nonetheless. The article is called "Ways to Reflect the 'Fog of War'" and focuses primarily on exactly what I was looking for: design ideas for making various aspects of strategy games uncertain. I got a lot of influence from this article about how I would keep the location of the player's objectives (and simultaneously their enemies, as they are the same thing) uncertain, and decided to give the enemies randomized starts at the start of each session, obstruct them in the game world and on the map by the fog of war, and make them attack in small radii. I felt that this would be enough to provide a good level of uncertainty to keep the game strategic and less focused on chance and prediction.

System & Mechanics

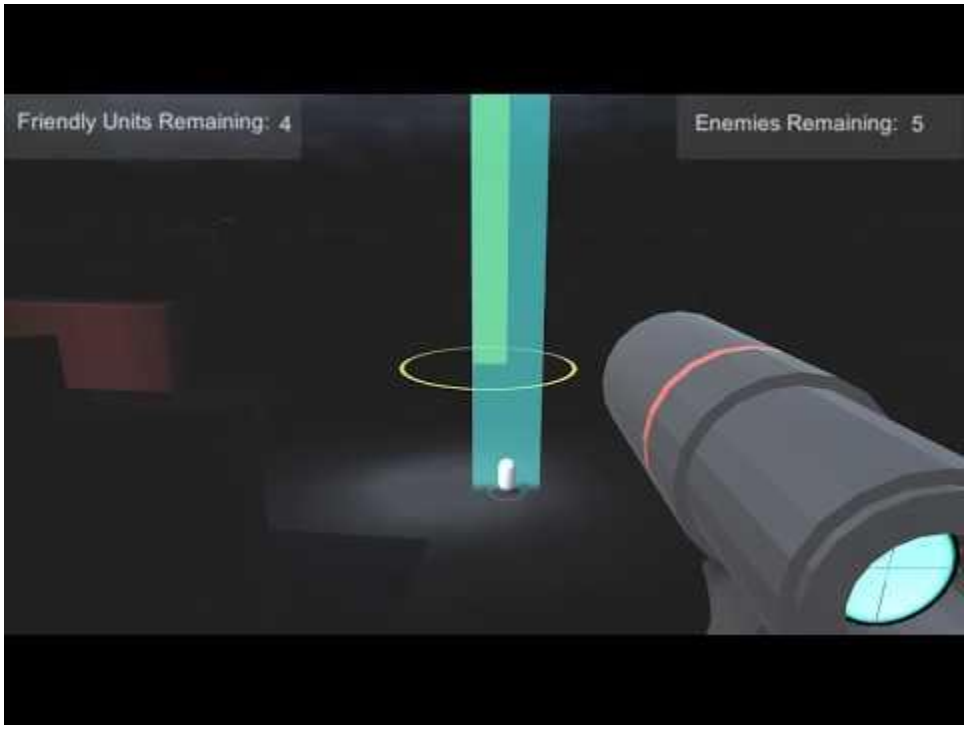
Explanation

The system gives the player control of a first-person character equipped with a handheld spotting scope and places them inside of a "command center" that overviews the field and that they can move around in. A fog of war covers the game world, with only the command area initially visible. Inside the command area is a map on a table that shows the terrain of the level and is also obscured by the fog of war. Outside of the tent are several units that the player can send out into the fog to clear it from the map in order to reveal the locations of enemies, which have randomized starting positions every session. As units get farther away from the command tent, the scope must be utilized to be able to select the units from afar and the player must also move around the tent to select and give orders to any units obstructed by the terrain or fog.

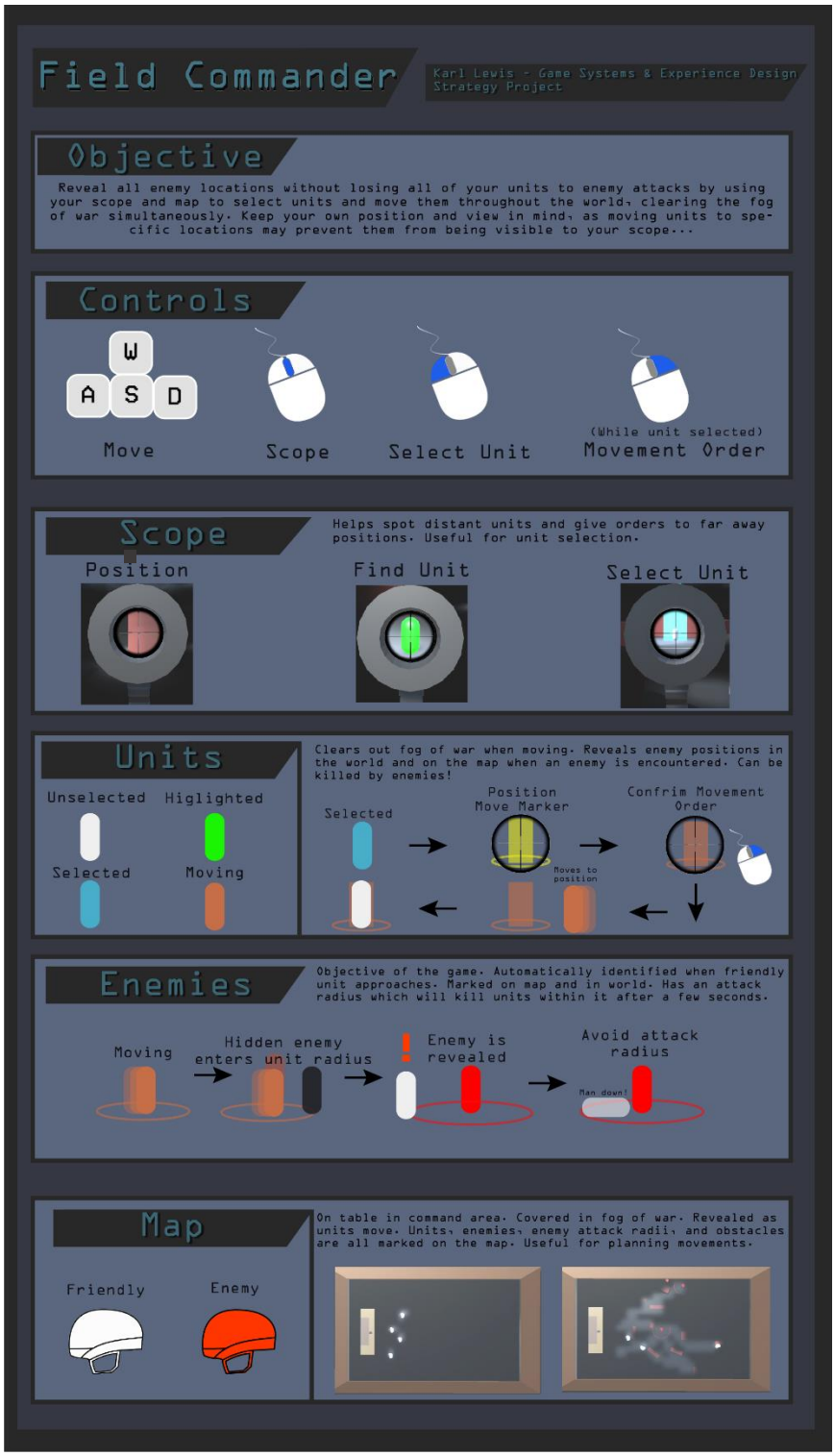
Players can move around the tent area using the WASD keys on their keyboard. The scope is aimed using movement from the mouse. Clicking in the scroll wheel toggles the use of the scope. Looking at units through the scope changes their color to green, indicating that they can be selected. When a unit is able to be selected, clicking the left mouse button will select the unit. Once selected, a blue beam of light from the sky appears at the unit's position and the unit turns blue to indicate the selection. Additionally, a yellow beam appears that follows what the scope is looking at. This is the movement indicator beam that determines where a unit will move to once it is given a movement order. When an adequate location has been identified with the scope and movement indicator, clicking the right mouse button will pin the location down with a new orange marker and complete the movement order. The unit will then automatically move to the orange marker and await new orders upon arrival.

As units are given move orders, the fog surrounding the terrain and the map in the tent is cleared away gradually, revealing the terrain and any enemy positions. Enemies can be seen in the game world as red units and as red icons on the map with a circle radius surround them. This radius is their attack radius, which units must avoid. If a unit enters the attack radius for more than a few seconds, it will be destroyed. If all units are destroyed, the game is lost. If all enemy positions are revealed and at least one of the player's units remains, the game is won.

Video Overview Storyboard



Visual Design Document



QA Testing

Test Plan

Test Intent: The goal of this test is to determine if the desired intent of my strategy prototype has been successfully achieved in a playable form. Survey questions relate to the testers' decision-making processes while positioning their units and their avatar to acquire information. The prototype will be considered a success if players think about their own position relative to their units' positions before giving orders to their units, as well as if the units and interface adequately relay tactical information to allow players to form strategies around the uncertainty of the fog of war. I plan to get feedback from at least 4 different people, and will hold the test informally outside of the testing lab.

Testing Setup & Procedure:

1. Explain concept of the system and controls to tester
2. Launch game and observe if tester notices instructions in game world. Record observation.
3. Observe tester behavior as they play the system until they are finished.
4. Have tester fill out form
5. Thank tester for their time and feedback

Test Questions:

1. Did you think about your position relative to your units' positions before moving a unit?
2. What factors did you consider before giving a unit a movement order? (e.g terrain, enemy location, your field of view etc)
3. Were you able to easily locate the positions of your units?
4. Did clearing the fog with the units provide you with adequate information to plan your next move?
5. How often did you use the map?
6. Was the map a useful source of information? Why or why not?
7. Was it easy to tell which unit you had selected?
8. Was it easy to tell where you could order a selected unit to move to?

9. Was it easy to see parts of the terrain and map that had been cleared by the units?
10. When enemies were revealed, were you able to plan unit movements to avoid getting attacked? Why/why not?
11. Did you find all the enemies and win the game?

Survey: https://goo.gl/forms/T0WGsJq0RiXINkTb2

Test Results

Summary: Overall, the test was mostly successful but a few problems prevented the experience from being a complete success. I only got three people to test the game, which was one below my goal of four. All three of the testers have little to no experience with strategy games and are all students at Champlain College. Two of the testers are game production majors at Champlain College. They all seemed to enjoy the game while they were playing it, but also seemed frustrated with some of the mechanics at points.

Survey Responses:

1. Did you think about your position relative to your units' positions before moving a unit?
   A) Yes: 3
   B) No: 0
2. What factors did you consider before giving a unit a movement order? (e.g terrain, enemy location, your field of view etc)
   A) field of view, what units were close by
   B) I tried to consider the terrain, as well as the current enemy locations on the map.
   C) I considered the still foggy places at first, then I started considering the currently found enemy locations.
3. Were you able to easily locate the positions of your units?
   A) Yes: 1
   B) No: 2
4. Did clearing the fog with the units provide you with adequate information to plan your next move?
   A) Yes: 3

B) No: 0

5. How often did you use the map? 1-6
   A) 1 (Not at all): 0
   B) 2: 0
   C) 3: 1
   D) 4: 0
   E) 5: 2
   F) 6 (All the time): 0
6. Was the map a useful source of information? Why or why not?
   A) the location of the enemies and where I've searched
   B) It certainly is good to get a top down perspective, as well as being able to see exactly where the enemies are.
   C) It was useful but not enough to properly position yourself.
7. Was it easy to tell which unit you had selected?
   A) Yes: 3
   B) No: 0
8. Was it easy to tell where you could order a selected unit to move to?
   A) Yes: 1
   B) No: 1
   C) sometimes the view collided with the wall and I could not tell if I was looking at the floor or a wall
9. Was it easy to see parts of the terrain and map that had been cleared by the units?
   A) Yes: 3
   B) No: 0
10. When enemies were revealed, were you able to plan unit movements to avoid getting attacked? Why/why not?
    A) not really, I was more focused on finding all the enemies

B) I tried my best, but it was hard without being able to see the map as well as the 1st person perspective

C) A bit. Yes because you could see their radius, but no because you could not see the path of the boys.

11. Did you find all the enemies and win the game?

A) Yes: 2

B) No: 1

12. Additional comments/feedback/suggestions?

A) the movement of the player while using the scope is buggy.

B) I love this idea

C) I really like the concept and the audio; you're killing it!!

Resulting Observations:

1. Testers thought about their own strategic position before moving units
2. Field of view, terrain obstacles, and enemy locations were considered before making moves
3. Locating units in the game world was not easy to accomplish
4. Clearing the Fog of War was useful for letting players plan their moves and also added uncertainty to the experience
5. The map was useful for getting a different perspective and see where enemies were, but hard to use to position units
6. Unit information was a mixed bag: it was easy to see which unit was selected and the areas of the map they revealed, but the movement indicator did not make it easy to see where units could be moved to.
7. Movements couldn't be planned around enemy locations because the path of the units wasn't displayed and the map wasn't present at all times

Analysis: Based on the survey responses, the prototype seems to have succeeded in some areas and failed in others, making it a partial success. The prototype definitely succeeded in delivering a strategic experience since players considered multiple factors before making moves and didn't just click mindlessly. The prototype was also successful at delivering the intended experience, since players did in fact think about their own positions relative to their units' positions before making moves, meaning the idea of a first person "field commander" can

work. However, the test was only partially successful in reaching the success criteria outlined in the test plan; while players did think about their positions before moving, parts of the interface failed to adequately relay tactical information, which hindered the ability to adapt to tactical situations and formulate strategies.

A major problem area is that testers had difficulty locating their units in the game world, despite the fact that they were displayed on the map. This was because of either the obstacles in the scene blocking unit positions or the fog of war being too thick to see past at the game start. A perhaps even bigger problem area was that testers had trouble seeing where they could move their units to. This is because the movement indicator gets stuck on the obstacles that aren't the floor, and because the ground is dark within the fog of war, making it difficult to see what surrounds where a unit is moving to. A final problem area was with movement planning once enemies were added to the equation; since testers couldn't see the path that units would take before moving to an assigned position, it was hard to predict if the unit would move through an enemy attack radius and get killed. The map not being usable at all times also seemed detrimental to the strategic experience, because while it was in fact a useful addition, players had trouble using it because of the fact that it was stuck in a specific place and not a mini map or toggleable map that goes with the player.

Based on tester feedback, I have identified solutions to these three problem areas that could improve the experience going forward. For locating units, a shader could be used that makes an outline of the units' colliders visible through walls, similar to spectator modes in some competitive games (e.g Counter Strike). That way, players would always be able to see where their units were in the actual game world and be able to adequately reposition themselves without running back and forth to the map. Speaking of the map, while the physical "war planning table" idea is cool on paper, it actually takes away from the good UI principal of "giving the player the information they need immediately" that I learned from in my research. To make the map more useful and intuitive, I would make it a togglable overlay on the screen with a key or button press. That way players could bring up the map when they need it and then switch right back to using the scope. It could also be made a mini map. The movement indicator could be improved by making it highlight the portion around the ring in the fog of war so players can see a glimpse of the geometry around it. Since the enemies are hidden until a unit reveals their position anyway, this wouldn't give their positions away. Lastly, to fix the issue with not being able to plan around enemy positions, an arrow between the currently selected unit's position and the position of the movement indicator could be drawn on both the map and in the game world. This would allow players to see the exact path that their unit would take before committing to the order, providing the information necessary to plan around enemy positions.

Survey Results:
https://docs.google.com/forms/d/1auo6pIFnq6RXS8bmUCotmpdau_qo9MXkSpGJ4kPntX0/edit?usp=sharing

Post Mortem

Based on the test results and from watching the testers play the game, I can conclude that this system was a partial success. It was definitely successful in delivering an experience focused on strategy and logic and succeeded in meeting my intent. Testers realized the importance of their own position before moving their units and found the intelligence gathering through the fog of war line of sight both useful and engaging. Parts of the interface were successful in conveying information, namely the unit selection indicator, the fog of war clearing, and the map overview. Other parts of the interface such as unit positions when not selected and the path units would follow failed to easily convey information.

What Worked:

1. The controls were easy to use and didn't overwhelm players.
2. First person movement worked surprisingly well for a real time strategy game. The scope was a good substitute for the "god view" in other strategy games since it let players easily see distant units that weren't otherwise hard to spot.
3. The two pillars of my intent (strategic positioning of both the player and units, intelligence gathering) were conveyed exactly as envisioned and functioned properly. The environment was successful in getting players to reposition before selecting units and the fog of war succeeded in making the intelligence gathering clear and have an element of uncertainty.
4. Using the "beams" of light for indicators was a good decision. Players found it easy to tell which of their units was selected and where enemies were located in the actual world because of the beams.
5. In general, the map served its main purpose; giving the player a bird's eye view of the situation and allow them to plan their moves. However, it only allowed them to account for *certain* information, not *all* information.
6. The last minute decision to make some sound effects for unit related feedback paid off greatly. Testers not only enjoyed the audio but also reported to me outside the survey (since I had no questions about it) that it fundamentally helped in helping them know what was going on.

What Didn't Work:

1. The fog of war made it too difficult to see where friendly units were in some cases. This led to confusion as to what was the ground and what was an obstacle.
2. The movement indicator got stuck on obstacles and consequently made it difficult to give movement orders. It was also to difficult to see where the movement indicator actually was in terms of the environment since its ring didn't light up the surrounding area.
3. The map failed at helping players with unit positioning because it wasn't instantly usable and didn't display unit movement paths.
4. Bug: enemies can spawn inside of obstacles. This can lead to some confusing games even though the enemies can still be spotted.
5. The 3D fog of war could potentially be extremely resource demanding on some systems. While all the systems I tested it on ran the game at a very high framerate (upwards of 250fps), older machines might not perform nearly as well.

What I Learned:

Perhaps my biggest takeaway from the experience of designing this system was that **nailing the user interface is of the utmost importance when presenting the player with lots of information at once**. Much of the time I spent on getting the 3D fog of war to work right and getting the scope looking nice could've been better spent on refining and tweaking the UI to make it give the players all the information they needed. For example, the unit movement paths were a planned feature that I didn't add because I deemed them non-essential, when it turns out they were absolutely essential for a core part of the strategic element of the game. I also learned that **strategy games don't have to give players a huge overview of the world at all times** to provide them with the information they need to succeed. I think that the success of this system in regards to my intended experience shows that there is potential for strategy games to have a more immersive perspective and feel while still providing all the necessary information to players in an easily viewable and usable way. With more refinement in the UI and some different design decisions, I think that a system like this has potential to be fleshed out into a much bigger game. Overall, this experiment taught me not to underestimate the power of a good user interface. As a designer that has little experience making UI (I focus on the gameplay side of systems as well as sound), this experiment helped me gain experience working with UI and helped me learn a lot about how to properly implement it so that players can know what they can do, where they can do it, and what the game wants them to do.

Annotated Bibliography

Firaxis Games. *Sid Meier's Civilization V*. 2k Games. 21 September 2010. Video Game

Sid Meier's Civilization V (Civ 5) is a turn based strategy and 4X game available on Steam since 2010. The gameplay revolves around picking a famous civilization from world history and leading it from the ancient era to the modern era in order to emerge as the dominant civilization in the world through a variety of victory conditions.

Key takeaways:

- Unit management and positioning a key part of the gameplay loop and reward systems
- Grand strategy needed in order to emerge victorious
- Gathering intelligence by exploring/removing fog of war essential to strategic process
- Interacting with units is effortless and displays all the right information

The strong significance of unit positioning and management as well as the importance of gathering intelligence in order to succeed was the main design influence on my system from *Civ 5*. Having a very streamlined unit management and movement system that simultaneously keeps players informed is an integral part of the game, and I aimed to replicate that on a smaller and more personal scale by having players control a character in the field instead of an unseen commander up above. I learned the importance of the conveying of information to the player while deconstructing this game, as a core part of my system's strategic elements come from the ability to see where the units are and where they will move next even though they are very far away from the player.

Goetz, Phil. "Too Many Clicks! Unit-Based Interfaces Considered Harmful." *Gamasutra Article*, www.gamasutra.com/view/feature/1839/too_many_clicks_unitbased_.php?print=1.

This article discusses practices that lead to a UI design that minimizes the amount of clicks players must make to control units in unit based strategy games. The article goes in depth about the idea of a "span of control" that real life commanders and leaders are given and how it can be applied to better the interface of unit-based games, which limits their jurisdiction to around seven other entities.

The article begins by establishing the problem with "overclick" in unit based strategy games, mainly how it takes away from the strategy involved and makes the game more about click speed than strategy among other things. The article then discusses the "rule of seven", or the idea that a player can only *truly focus* when they have a span of control on up to seven objects at a time; as the number of manually controlled units increases past seven, focus decreases. The article concludes by suggesting several ways to detect and rectify overclick, namely by using UI profiling and making units semi-automated.

Key takeaways:

- "If a turn takes a minute, and a player makes a move more than about once every 10 seconds, that player probably isn't focused and isn't getting an opportunity for the kind of deep, strategic thought that is supposed to be the source of enjoyment in a strategy game"
- Having control of more than seven entities at once can cause frustration and is a sign of flawed user interface design.
- Specifying unit behaviors only once or twice and allowing them to work automatically after that can rectify this issue

This article inspired how I designed the unit movement mechanics and interface for my system. The idea of having a small number of units to control (including the player character "unit") as well as the single click required to give a unit a movement order are examples of influence from this article on my design. I learned the importance of making a strategic game actually manageable in terms of the number of things that players need to control, since a lower number of units to maintain leads to a higher degree of focus, and a high degree of focus leads to a high degree of strategy.

Pulsipher, Lewis. "Ways to Reflect the 'Fog of War.'" Pulsipher Game Design, 2 July 2009, pulsiphergamedesign.blogspot.com/2009/07/ways-to-reflect-fog-of-war.html.

This article discusses design strategies to include uncertainty in strategic and tactical games, or the "fog of war" mechanic seen in many of these kinds of games. The article compares and contrasts fog of war with its opposite (perfect information) and various different ways to prevent players from seeing opponents moves, such as covering the back of player's units in board games like Stratego.

The article begins by defining the idea of uncertainty in strategy games and "fog of war" before making the distinction between uncertainty of player intentions and uncertainty in the game's design, with the latter being the focus of the article. Afterwards, the article proceeds to define several sectors in which uncertainty can be added by design, such as uncertainty about strength/location (power of units, where units are), capability (what can the enemy do?), combat (dice/random numbers), timing (scripted events in certain games), non player forces, and objective (in a tactical sense). The article concludes by stating that games without a level of uncertainty are nothing more than games of chance.

Key takeaways:

- Keeping certain elements of an opposing force's location and strength uncertain encourages strategic reactions to unexpected situations
- Uncertainty of objective in moment to moment tactical situations causes players to adapt their plan in accordance.

- "If you want a good game, the level of uncertainty must be kept in check, or in the end you have nothing more than a game of chance (as in traditional Battleship)"

This article inspired how I designed the fog of war mechanic on the map as well as the objective of the player. The idea of causing "uncertainty in the objective" of players can be seen in the randomization of enemy and objective positions at the game's start, meaning players must learn to adapt to the situation every time they replay. "Uncertainty in location" is also a big part of my design, as the main goal of the player is to identify enemy locations as they clear the fog of war from the map, and these locations are uncertain because of the fog of war. I learned the various forms of uncertainty in strategy game design from this article, and even though it is aimed towards board game design, the principles within it certainly apply to video games as well.

Quintans, Desi. "Game UI By Example: A Crash Course in the Good and the Bad." *Game Development Envato Tuts+*, 22 Jan. 2013, gamedevelopment.tutsplus.com/tutorials/game-ui-by-example-a-crash-course-in-the-good-and-the-bad--gamedev-3943.

This article discusses the realm of user interface and user experience (UI/UX) design in video games. The article uses specific examples from games with both good and bad UI/UX elements to demonstrate the impact that UI/UX design has on the player's experience.

The article begins by introducing the concepts of UI and UX and gives contrasting definitions of the two disciplines. Next, the article discusses 6 fundamental questions UI designers should ask themselves to determine if the UI is delivering a good user experience. After suggesting ways to practice UI/UX design and talking about who typically handles this line of work, the article provides examples of bad UI and good UI in depth before concluding with the 6 fundamental questions again.

Key takeaways:

- Good UI tells users what they need to know and then leaves them be to maximize immersion
- Interfaces should provide information without long animations or delays
- Information displayed in interface elements should be easy to find and understand
- The interactions with the interface should be obvious and follow conventions

This article provided me with a lot of valuable information for designing the interface of my system, as it is pivotal to the success of a strategic experience. I wanted to make sure that the interface with the unit location and movement indicators as well as the map system was easy to understand and observe while also not being too much of a nuisance to the player's experience. I learned that a streamlined and non-intrusive UI is key to helping the player understand what is happening in the game while simultaneously keeping them immersed in the gameplay.

Additional Sources

- Projector fog of war (seen on map and ground of terrain) created from tutorial posted by Andrew Hung
  https://andrewhungblog.wordpress.com/2018/06/23/implementing-fog-of-war-in-unity/
- Music in video storyboard by Avery Alexander
  https://www.youtube.com/watch?v=i_KwBPaWFAw&t=5s