



# MERC Game Based Learning Challenge Proposal

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RFP Request for Proposal No. MU-2012-03

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April 26, 2012

Mercer Engineering Research Center  
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Warner Robins, GA 31088

Dear MERC,

Good Game Innovation is submitting this RFP in response to the Game Based Learning Challenge. Here at GGI, we have developed a solid game concept we believe will be the best proposal to your challenge; *Trial by Fire*. *Trial by Fire* will be a historically based first person real time strategy game. The player will be placed in the shoes of a historical military figure, and given the same tools available at the time of the battle being portrayed. Not only will this game teach the player the historical significance of various military campaigns, it will also instruct the player in actual military doctrine and leadership skills. A detailed description of the game is inclosed as well as a plan to gather support and funds for this project. The final production milestones and basic game functions are also included. Thank you for giving the GGI team this awesome opportunity, and we hope to be working with you soon on *Trial by Fire*.

Best Regards,

John B. Smith III (Trey)  
Team leader

Patrick Hobbs  
Team liaison

Brandon Barker  
Team internet researcher

Andrew Galczynski  
Team history expert

Cc: Dr. Jennifer Goode, MUSE-EI Subcontract Administrator

Attached: GGI Game Challenge RFP

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## **Introduction**

### **1.0 Overview**

Mercer Engineering Research Center's (MERC) software development department has given out a request to produce an education interactive media program. Good Game Innovators (GGI) have taken on the task of developing an educational style video game to be further developed and produced at MERC. The game concept will be developed to the extent to be posted on the independent innovation site Kickstarter, who brings great ideas and great investors together, to gather funds for the non-profit MERC. GGI has developed a first person real time strategy game with a historical and realistic simulation bent. On the grand scale, the game would encompass multiple battles from World War 1 all the way to modern times, allowing the player to experience the battles first hand as various ranking officers. However because of budget and time constraints, this would just not be possible. Therefore, the game has been distilled down to its essence which will hopefully be open ended enough to further expand the concept if/when time and funds become available.

### **1.1 Structure and skills of Good Game Innovators**

GGI is comprised of Andrew Galczynski, Brandon Barker, Patrick Hobbs, and Trey Smith. Andrew Galczynski is the team's resident Biomedical Engineering major and historical expert. He is also an avid gamer and can piece together problem statements for playing functions to better explain a games primary mechanics. Brandon Barker is a Mechanical Engineering major. His main focus has been tending to the online community aspect of the project, with how to create a site to grab programming support, and various aspects of Kickstarter . Brandon is in charge of making sure GGI will have all that is needed to upload the project to Kickstarter.

Patrick Hobbs, a Technical Communication major (TCO), is the team's MERC liaison. Because of the unique qualities of this project, GGI has been working closely with the client to properly develop a viable product that is only lacking in funds to be able to be produced. He is also an avid gamer, has an excellent eye for detail, and can also develop solid action statements that further the practicality of the game. Trey Smith is the second resident TCO major and the team leader for GGI. Trey has been involved with media production since high school, and brings a grasp of what it takes to produce a viable, enjoyable, and sell-able product. He is also a recreational gamer involved in a few elite gaming communities through his more gaming involved brother and childhood

friend. His primary role is to help out where needed and direct the team on a straight path to keep the project in scope.

When it comes to the actual development and creation of the game, we will be handing off the baton to MERC. Hopefully GGI will be able to stay involved in the project after the RFP has been submitted in order to keep the original vision of the game. MERC is a highly capable group of individuals who we are sure can produce a superior product and innovative educational game.

## **1.2 Phases of Game Development**

There are two phases of this game's development. The first phase can be further broken down into two distinct sections: the promotion of what GGI would love for the game to one day become and what we plan on actually developing after raising the money on Kickstarter. The second phase would begin if the project is able to gather enough funds to be developed on Kickstarter. At that point, the project would be in the hands of MERC to produce and the GGI team to give out donation awards (incentives advertised on the Kickstarter page to help garner project donations and support). GGI hopes to still be involved in the project development as well depending on school schedules.

### **PHASE ONE**

## **2.0 Technical Approach**

### **2.1 Explanation and implementation of Kickstarter.com**

Kickstarter.com is a very intriguing website where people post their creative ideas along with a budget for their project idea. People can then donate/pledge money to their project in order for their idea to get funded and eventually get created. Our project idea includes posting our proposal onto the Kickstarter.com website in order for it to get funded. A very important note is that the creator(s) set(s) a budget for the project and set(s) a time-line between 1 and 60 days for the budget to be obtained. If the project reaches its budget goal and is fully funded within the deadline that is set forth by the creator(s) then the pledged money is transferred over to the creator(s) so the project can be produced. However, if the project does not reach its budget goal then none of the money from the website is transferred to the project creators and the money people pledged is not taken away from the pledgers.

We plan to put our educational video game titled "Trial by Fire" onto Kickstarter with a goal of obtaining \$200,000. After researching other similar video game ideas posted on Kickstarter and talking to people at MERC about our proposal, we believe \$200,000 is a realistic and necessary goal amount. The goal of the Kickstarter page is

to receive funds of at least \$200,000. Further information of how we came up with the \$200,000 budget is shown later.

The most difficult stage in creating a project and posting it on Kickstarter is creating the rewards for the pledgers. Rewards are what pledgers receive in exchange for donating money to the project. Our ideas are that the rewards in the lower level stages (i.e. \$10 to \$35 donations) are rewards that aren't real world or necessarily tangible so they don't have a real cost to us. One example is acknowledging the backers in the game manual. However, people who donate more will be given rewards that are more tangible and have an actual cost. While researching other projects on Kickstarter we realized most projects had at least one reward bracket which included a copy of the game. However, since our game is free we are not able to use this as one of our reward brackets.

According to Kickstarter's website, the most popular pledge amount is \$25 and the average pledge is around \$70. Kickstarter highly recommends having lower end rewards. Projects without a reward less than \$20 only succeed 35% of the time, while projects with a reward less than \$20 succeed an impressive 54% of the time. The rewards we have created are as follows:

### 2.1.1 Kickstarter Rewards

Pledge Amount	Rewards	Notes
\$5 or more	Exclusive desktop wallpaper for your PC or Mac.	An insignia for "Trial by Fire" can be created to make wallpaper and dispersed to the pledgers without a cost to us besides the creation of the insignia, which we will need anyway. Also, this could help us market our game to others who see the desktop wallpaper.
\$10 or more	Acknowledgement in the game manual.	Again, this means we will not have to provide a tangible reward so it has no real cost to us at GGI.
\$20 or more	Your name will be featured in the game, most likely as a private.	The name of everyone in any historical Battle can't be found and names would have to be created anyway. This is a good way for us to receive pledge money and get a list of peoples' names to put into the game. Again, this has no real cost to us at GGI.



\$30 or more	Early “beta” access to the game before it is officially released.	This is a “valuable” reward for many people because they can play the game before it is officially released. This helps us because we again do not have to provide a tangible reward and we can receive feedback from our fans to fix anything wrong with the game prior to its release.
\$50 or more	Dog tag with your name plus the name of the game + Vote for the next battle	We will have to get pledgers’ information if the budgeted \$200,000 is obtained. Also you can vote for the next battle if another battle is simulated. This way we can hear our pledgers input and they can voice their opinion.
\$100 or more	T-shirt with the designed logo of the game	We will have to get pledgers’ information if the budgeted \$200,000 is obtained. This also allows us to market “Trial by Fire”.
\$150 or more	Various in game objects as well as premium access to the game’s forum where you can live chat with the creators of the game in order to check on progress.	There are a lot of gamers out there that spend a lot of money and time into games to unlock item in games. This is one way they would be able to. Also, we plan on creating a forum if the game is created about the game. Premium access would include being able to chat with the creators of the game whether they be the programmers at MERC or us at GGI.
\$500 or more	Signed autograph from the creators of the game and early access to the full game if it is created.	This is a valuable reward and is worth money but is something we can create ourselves. Also, access to the full game if it is created could prove to be very beneficial to the pledger and us at GGI and the programmers at MERC.
\$1000 or more	Video chat conference with the creators of the game	The pledger will be able to give their input and ideas directly to the creators at MERC.
\$2000 or more	Animation of pledger into the game as a significant character.	This is a lot of money for someone to donate to our game. So we will need to spend some time on this one.

Note: Pledgers receive every gift below their price point.

Pertaining to the rewards, we do not need to worry about our donors shipping information or even our rewards themselves until we know if our project is fully funded or not. However, we need to take into account the prices of our rewards as well as the

shipping costs of getting the rewards to our donators. These two aspects take away from our profit. Having said this, having no tangible rewards is a horrid idea because potential pledgers are less likely to pledge money if they don't receive anything of true value.

### **2.1.2 Ways for Kickstarter proposal success**

On Kickstarter we must precisely define the goals of the project as well as the creators' capability to create the game; the goal isn't to create the game itself, but to create a demo level for the game. We want our project to come across as modern, exciting, and interesting, but also educational. A clear and concise description of our game will help us reach our funding goal. If people reading our article on Kickstarter find it confusing, unprofessional, or unappealing then we probably won't obtain our goal of \$200,000.

Also, Kickstarter allows you to add a video onto your Kickstarter page. According to Kickstarter, projects with videos get fully funded 50% of the time, opposed to only a 30% success rate if the page doesn't include a video. Creating a video allows you to convey the message of your project in a more efficient way and allows you to put your face in front of the people that are considering donating to your project. It also shows your dedication to your project idea.

Promotion of the project is key. If the project has no momentum and isn't funded very much initially, people are most likely going to overlook it because they think it's either a bad idea or it isn't going to be funded so what's the point. Getting family and friends involved could be a good route. Also, posting information about the project on social networks like blogs or Facebook could be very beneficial in gaining momentum for the project's funding. Creativity is important in spreading the news about our project. Possibilities include making flyers, contacting local newspapers, magazines, or even radio stations.

## **2.2 Game Development**

There are many video game types out there and most avenues have been explored from an entertainment perspective. Here at GGI, we understand what "gamers" want, but we want to give them experiences that they can take and use in real life. In other words, we want them to learn something tangible to the real world. In the game that GGI is proposing, there would be three major learning elements.

The first is to learn the historical significance of major battles, in this case Guadalcanal. The Battle of Guadalcanal was chosen to be the demo level for a number of reasons. First, the actual historical progression of the battle itself made it ideal as a tutorial level (from the perspective of the Americans that is). The battle started out slow

with little confrontation but escalated over the course of several weeks to an all out hell. This would allow a player to get comfortable with the interface and then let them go have fun while learning a great deal.

Second, the objectives that the Americans had for the battle allows us to give the player something more to do than just “Go in and kill all the bad guys.” They had to capture an under-construction airfield without damaging it, complete it while under attack by the Japanese, hold out for however long it took for the navy to return to the area (they had been forced to retreat by the Japanese the day after the invasion), and then drive all Japanese forces from the island. All the while the officers had to contend with their men being afflicted by disease, thirst, starvation, malnutrition, and exhaustion from exertion, lack of sleep, and the horrible heat on the island.

Third, and final, the battle itself was very much touch and go the entire time, even weeks into the fight. Either side could have won the battle overall and this makes it perfect for what GGI wants to do. The sheer number of possibilities present in the battle will allow for a varied and complex gameplay and a different experience every time the battle is played.

The second educational element of the game will come in how commands are given. Because the game is a strategy game from the first person perspective, we want to create an environment that will give the player a taste of “fog of war”. “Fog of war” is where a commander or even whole army don’t have real time observation of some area that they are in or approaching. In other words, an area where they may or may not know the layout of the land, but more importantly they don’t know where exactly the enemy are.

This could be a great way to give personal training in the military great experience in making snap decisions in a war setting without being put in a dangerous environment. In a more advanced version of the game we envision the player being able to be any rank of the military and have all the same responsibilities in game as they would in a real life situation. Finally, the third learning experience is learning actual leadership abilities and varying degrees of military tactics. The goal of GGI is to make this game as realistic as possible and as accurate to create a unique learning and gaming experience for anyone interested in anything historical and military.

### **2.2.1 Detailed game description**

The game begins with the player on board a US Naval Vessel watching as US Marines make an amphibious invasion of Guadalcanal. After a short cut-scene of actual war time stock footage showing the marines landing with no resistance the player will be ushered to a landing craft where, along with his staff, he will land on the island. There he will “witness” more stock footage of men landing, moving inland, unloading equipment, and otherwise going about their business.

Thereafter, the player will begin the tutorial where the movement controls will be shown. The player will move into the jungle where he will be informed that the advance teams on the island are encountering snipers and the player will be asked what the men should do. Here the basics of issuing orders will be covered and the player will experience the consequences of their first command decisions. For tutorial purposes, the player will be shown a number of possible commands they could have given and their respective consequences. From here on out though, once a decision is made the player cannot go back and change it.

Time will skip forward a bit and the player will be shown arriving at Henderson Airfield where he will choose the location of his command tent. Set-up of the tent will then begin and here is where "random events" can begin to occur. By "random events" we mean that anytime the player is actively engaged in the game (ie not in a cut-scene) men could run up to the him and inform him of important information like Japanese troop movements or attacks, the loss of contact with troops or the navy, or opportunities that men in the field have come across. These will not be preset but determined by the computer each time the game is played. Thus, nothing could happen as the tent is being set up, the Japanese could stage a counter attack, or units in the field might be in dire need of support and the player has to make a decision.

However, after the tent is set up the player will be brought in for the basics of how to interact and use his staff and equipment. This will include conversing with the different advisors and officers who will be assisting in commanding the soldiers as well as use of the island map, the sand table map, the radio, and the runners' station. The advisors and officers will have their own responsibilities and will be themselves commanding troops. Their main function though is to inform the player of the situations on the "front" and provide advice on what to do. Often they will speak up on their own but the player may speak to them at any time.

The island map will slowly be updated as more and more of the island is explored and mapped and it's main use is for keeping track of the major geographical features of the island. The sand table will be an enlarged version of the island map and will feature figurines showing the locations of the players troops, locations of enemy troops, and any naval vessels that have been spotted off shore. None of this has to be accurate, the sand table map has to be manually updated by the player and/or the support staff. This means that it can and likely will have errors, either from it not being updated or from someone updating it incorrectly or with incorrect information. The radio will be used for receiving reports from men in the field and for getting information and orders out to those men. The runners' station will also serve this purpose but will obviously be slower but not subject to equipment failure or signal loss. However, runners can get killed before or after reaching their target.

After that brief tutorial the game will then be entirely in the hands of the player combating the computer controlled Japanese forces. To address the problem of the

battle having actually occurred over the course of weeks, there will be sections of time that will be compressed. These compressed segments will be where no decisions need to be made by the player but should the player come up with something that he wishes to put into motion, he will have the option of reinstating real-time. Again these compressed segments will not be preset but determined by the computer each time the game is played. The computer will also determine how long they are and when to force real-time back onto the player.

Real-time is where all the important decisions will be made by the player; where to send troops, where to set up defenses, how to ration the food supply, how to manage the wounded and sick, how to handle troops getting surrounded/ambushed/cut-off, responding to Japanese attacks on the airfields, etc etc with the goal being completion of the airfield and total defeat of the Japanese troops.

## **2.3 Feasibility**

At first we wanted to create a game on the same level of any AAA game on the market, that is a big budget title that has lots of development time, testing, and (usually) high quality. We are still shooting for that goal, however we are focusing on the fact that we want to have quality for the small budget, and are only focusing on how the game plays, not necessarily how the game looks. AAA games are mostly known for their huge production budgets, which we do not have. Nevertheless, there are plenty of very high quality and fun indie games, which do not have the budget of AAA's, out there, and we hope our game can join the ranks of ones like World of Goo and Limbo (if you have not played either of those, go check them out, they're awesome).

That being said, if we had a larger budget, there are a few things that we would love to be able to add to the game. The first being able to allow more actual exploring space for the character, like being able to walk outside the tent, explore the island, see actual battles taking place first hand, and be able to join in the fray. The next would be to add more characters that can be played, and add a direct command system where the player would be a squad commander who fought in the battles. Adding even smarter AI (Artificial intelligence) functions and various kinds of terrain the player must realistically navigate through.

The goal would still stay the same however. The primary concern of GGI is to make the most realistic battle simulation possible. Our biggest dream is for this game to be taken up by the military to be used in combat simulation education for military personnel. This is also a quite possible dream if the beta product actually shows entertainment, education, and potential.

## **PHASE TWO**

### **3.0 Operations Plan**

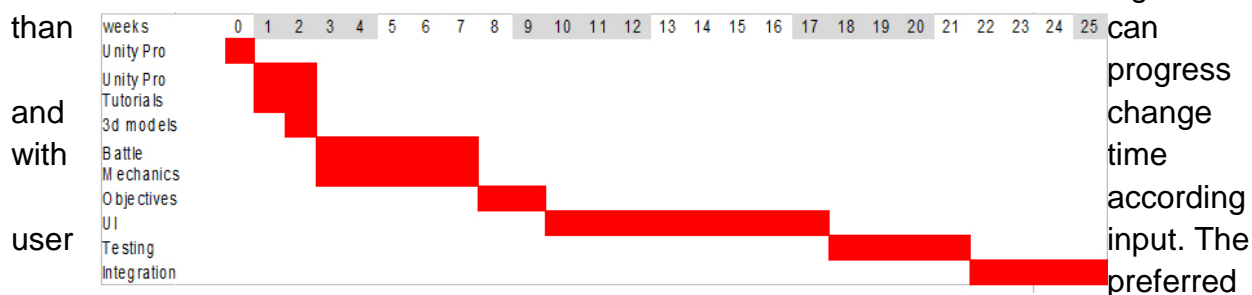
The final product will be produced by MERC. Once the game's proposal is posted on Kickstarter, GGI's responsibilities will be to spread knowledge of the project through several mediums including but not limited to facebook, twitter, and word of mouth. We at GGI are confident that Mercer's ROTC will endorse and support Trial by Fire through kickstarter.

### 3.1 Milestones

Once full funding of \$200,000 is achieved, MERC will assume \$175,000 for the salary of two full time programmers to work on the project over the course of six months. MERC will then use \$9,000 to purchase Unity Pro, a 3-D (three dimensions) game development tool, and necessary tutorials to take advantage of the program. In addition, the \$9,000 covers 'materials' cost which will be detailed later. The MERC side of the development team has stated that all of the members of GGI very well could be given internships so they can follow productions of Trial by Fire past TCO 341 into Junior year. As interns, GGI will act as content supervisors and generators. While there is a potential for us learning some aspects of game production, our roles will be mostly advisory in nature.

Game production consists of three distinct stages. MERC is essentially building a 3-D game engine from the ground up, slowing down the production process, but ensures that MERC and GGI will retain all rights to the game despite its nonprofit status. The first stage is setting the stage or 'environment' as a 3-D blank slate. The next logical step is defining a sky box. The sky-box is a constant sphere that contains the pre-rendered sky and is anchored to the player's character. MERC will then define the world explicitly. In our case there will be three settings that will be rendered in detail: the bridge of the naval vessel, the Marines' beach head, and Henderson Airfield. MERC will also develop the command tent, which will be present in two of the three settings, on the beachhead and on the airfield. Next will be populating the world with character models. For the sake of timeliness, character models and textures for the US Marines and Japan's Imperial Army will be purchased from third parties right free. The cost of the external models are included in the \$9,000 allotted for materials.

Game mechanics will detail how the MERC will turn the 3-D world into a game



control interface will be a traditional keyboard and mouse set up. The player will be able to navigate the world using the keyboard to move and the mouse to orient. The AI director will be programmed to respond reasonably to any of the player's action. Mechanics will also include the designing of a graphical user interface (GUI) so the player can manipulate in-game objects more easily.

The next stage will be fleshing out the default storyline. The 'Default' story will attempt to emulate the actual progression of the events on Guadalcanal given the appropriate action of the player. At this point GGI and MERC will have to decide exactly how expansive the freedom of response will be for the Trial by Fire's AI director. The smarter the AI director is, the more the development team risks going over budget in both time and money. If developing the AI proves to be too advanced for the timeline allocated by MERC we will have to revert to multiple choice "pick your own story" style of game.

Once the full storyline is smoothed out, Trial by Fire will go through an internal testing phase before eventual beta release to the appropriate Kickstarter backers. Through user feedback, Trial by Fire will go through a post production process in which all glitches are worked out, advertisements are distributed, and the Guadalcanal Campaign is released to the general public. Once the Guadalcanal campaign is released and community feedback ensues, GGI is prepared to develop follow up installments of the game using other battles in history as templates.

### **3.1.1 Gantt chart**

### **3.1.2 List of milestones and checkpoints**

Kickstarter

Funding

Make Game

a. Game Environment

i. 3D blank slate

ii. skybox

iii. Purchase Relevant Models ~\$9000

iv. Purchase Relevant textures

- v. world compass, coordinate system
  - vi. Inhouse modeling
    - 1. Bridge of Navy Vessel and Ocean
    - 2. Command Tent
      - a. furnishings
    - 3. Beachhead
    - 4. Airfield
  - b. Game Mechanics
    - i. Player
      - 1. 3D navigation camera
      - 2. Control interface
    - ii. AI Director
    - iii. animations
  - c. Game GUI
- 2. Game Testing
  - a. Internal Testing
  - b. Quality Control
    - i. No glitches
    - ii.
- 3. Beta Release
- 4. Community feedback
- 5. Demo Release
- 6. Community Support
  - a. expand game
  - b. functionality

### **3.2 Budget and final backlog for programing the game**

Because this game could be a huge undertaking, we do have some limiting factors, namely time and cost. Instead of just adding up what everything would cost (which is not really probable as everything is virtual, and there are very few material costs) and GGI developed a very grand idea, we have been limited by the amount of money and time we can spend on the project. It was determined that the highest probable amount of donations that could be gathered from Kickstarter is around \$200,000.

#### **3.2.1 Budget Chart**



Salary	\$175,000
Unity Pro	\$2,000
Unity Tutorials	\$180
Kickstarter Incentives	\$16,000
Materials (3D Models)	\$2,000
Misc.	\$4,820

### 3.2.2 Final project backlog

This is the final technical listing of what will be needed in order to create the game.

#### User Story

- ⤴ Rendered Game Settings:
- ⤴ Bridge of Naval vessel, Guadalcanal in distance
- ⤴ Command Tent: Beach
- ⤴ Command Tent: Airstrip
- ⤴ As the player I should be able to choose the location of my command tent
- ⤴ As major General Alexander Vandergriff I should be able to command the entire American ground force to victory.
- ⤴ I should be able to land on the beach at the start of the game and begin directing my troops immediately.
- ⤴ I should be able to both give very specific directions to my subordinates or give them a general order and let them use their own initiative.
- ⤴ I should be to give orders on everything from movement to supply distribution to combat tactics.
- ⤴ I should have a basic map of the island to begin with that should update as I order recon missions and troop movements.
- ⤴ I should have a radio with which I will receive status updates from commanders in the field.
- ⤴ I should have a table top map that will display the location of troops and equipment that uses the same figurines that were used in WW2.
- ⤴ I should have advisors working around me with their own jobs and who chime in from time to time on their own and when asked.
- ⤴ The airfield on Guadalcanal should be incomplete, but repairable through the direct actions of allied CCPs or the player, giving the player access to aerial reconnaissance, and initiating the endgame step.

Player movement:

- ⤴ As the player, I should be able to press the 'W' key, and move forward, for world navigation.
- ⤴ As the player, I should be able to press the 'A' key, and strafe left, for world navigation.
- ⤴ As the player, I should be able to press the 'S' key, and move backwards, for world navigation.
- ⤴ As the player, I should be able to press the 'D' key, and strafe right, for world navigation.
- ⤴ As the player, I should be able to press the 'A and W' keys, and strafe left while moving forwards, for world navigation.
- ⤴ As the player, I should be able to press the 'A and S' keys, and strafe left while moving backwards, for world navigation.
- ⤴ As the player, I should be able to press the 'D and W' keys, and strafe right while moving forwards, for world navigation.
- ⤴ As the player, I should be able to press the 'D and S' keys, and strafe right while moving backwards, for world navigation.
- ⤴ As the player, movements will cease when AWS keys are no longer depressed.
- ⤴ As the player, I should be able to move my mouse forward and look up at a corresponding angle, for world observation.
- ⤴ As the player, I should be able to move my mouse left and turn counterclockwise at a corresponding angle, for world observation.
- ⤴ As the player, I should be able to move my mouse backwards and look down at a corresponding angle, for world observation.
- ⤴ As the player, I should be able to move my mouse right and turn clockwise at corresponding angle, for world observation.

### **3.3 Quality Control Plan**

We have a three part quality control plan. Part one involves the Kickstarter community and our own game blog/forum while the game is being built and developed. On the blog/forum we will post about the games progress, ask for player input and try to collaborate to create the best game possible. The second part to our quality control plan is alpha testing.

Alpha testing will be more of an internal test to make sure the game is working relatively properly before releasing it to a closed beta test. We want to start with internal tests before public tests because anyone at anytime should be able to enjoy and learn from the game experience. The third and final part will be beta testing. Beta testing will

take place as we release it to various donors from Kickstarter. These final tests will help us have more eyes on the game to catch as many bugs as possible before a final release.

After the full game is released, the game may eventually become an open source project for everyone to collaborate and create on. GGI will still try to stay involved and add any patches and fixes as the need arises. Quality is our goal at GGI, and we hope that everything will function correctly and in line with our vision for Trial By Fire.

# Appendix

**Research**

## Web Pages

First Offensive: The Marine Campaign For Guadalcanal

By: Henry I. Shaw, Jr.

<http://www.ibiblio.org/hyperwar/USMC/USMC-C-Guadalcanal.html>

Appendix E: Marine Corps Station List: FIRST MARINE DIVISION

By: Zimmerman

<http://www.ibiblio.org/hyperwar/USMC/Guadalcanal/USMC-M-Guadalcanal-E.html>

## AI Research

“Smart” AI development

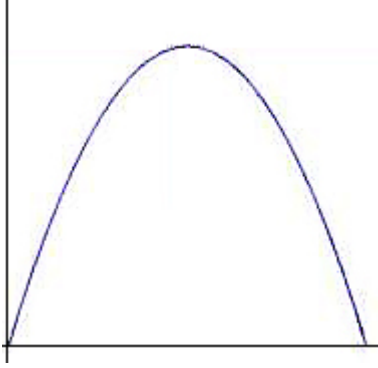
By Zac Shifflett

In the world of combat simulation, one of the greatest desires is to have emulated soldiers that can react with human-like qualities in live fire situations. However, no matter how much the AI is developed and generated, there is still an issue with computational requirements for it to be feasible in a realistic setting. The solution is to pull elements from everyday video game schematics that have been working for years. Assigning data values as “stats” for AI Soldiers would allow faster calculation and reaction within combat environments. These faster calculations would lower the strain on computations, and allow more power for realistic environments, or even more soldiers within the environment. All following ideas could be developed to incorporate different aspects of the game without adding immense load to the computations;

### Possible Stats:

7. Accuracy – Radius around the target that the AI will attempt to aim at (random pattern) during fire.
8. Responsiveness – How quickly an AI reacts to a situation or event.
9. Mobility – Speed of which an AI can navigate terrain.
10. Dexterity – Ability of AI to complete difficult tasks such as working machinery, and ability to move quietly.
11. Hearing – Ability of AI to hear commands or important environmental events, including enemy movements.
12. Bravery – Morale-based system that would determine actions within an environment.
13. Rationality – Used in unison with Bravery to determine how aggressive AI are, and how well they communicate.
14. Proficiency – Determines AI’s ability to use equipment they are not trained with, like vehicles or enemy weapons.
15. Stamina – Ability to walk, march, or run during combat situations without rest.
16. Sturdiness – Ability to take damage from environmental effects or shots without being incapacitated or killed.

All of these values, and any more that may contribute to the actions of the soldier would add up to an AI Ability Index Rating, or AIR score, which would determine how useful that soldier was in battle. AIR scores could then be used to manipulate forces and give advantages or disadvantages to forces depending on the requested simulation properties. These AIR scores would also be subjected to a balancing algorithm to prevent the system from randomly generating too many AI who are extremely proficient, or extremely cowardly. Soldiers generated by the algorithm would fall



under the line graphed to the right, so that the majority of soldiers were considered “normal”, while some soldiers would still be relatively strong or weak within their respective environments. After the algorithm distributes soldier’s stats to maintain a generally safe random distribution, environmental effects and general training bonuses would be applied to individual soldiers within combat. Soldiers trained in the use of the gun they are carrying would have increased accuracy, while soldiers walking through difficult terrain would have decreased mobility, and soldiers subjected to sound blasts or concussive forces would

have decreased hearing ability. These stat changes would all effect how AI preformed on the battlefield.

Finally, AI would be subjected to an environmental Danger Level, which would dictate how AI would individually react to combat situations. Everything from the number of enemy soldiers in view, to the health of the soldier, to even whether the sky is sunny or cloudy could affect the soldier’s perceived danger level, and dictate their actions. Soldiers with low bravery in combat might run in combat, while soldiers with high bravery might stand in the face of dozens of men. Those who flee may be spared, or more vulnerable to being shot, while soldiers who stay back might be gunned down, or even successfully protect their allies.

## All Backlogs

- ⤴ The model of Guadalcanal should be to scale, to increase realism.
- ⤴ The model of Guadalcanal should include most of the geographical and topographical features within 5 miles of the airstrip, this would allow the player, allied CCPs, and enemy CCPs.
- ⤴ As the player, I should be able to crouch in tall grass, for the benefit of being concealed from the enemy CCPs.
- ⤴ As the player, I should be able to refer to a specific allied CCP by voice/text/UI and issue a “go-to” command and the CCP will navigate the terrain efficiently without running into solid objects.
- ⤴ The map will have dynamic weather (rain) and day night cycles which will affect how far the player and CCP can “see”.
- ⤴ Relative humidity will affect sensitive electronics, such as radios, impairing player and CCPs communications with other non LOS CCPs
- ⤴ The player and CCPs should be able to manipulate the environment to clear paths in the jungle, dig foxholes, or construct defenses.
- ⤴ Jungle terrain/thick foliage should hinder player and CCP movement, for the benefit of realism.
- ⤴ Jungle terrain/thick foliage should reduce the player's and CCPs LOS until cleared, for the benefit of realism.
- ⤴ Rivers should have variable current speeds, depth, and widths.
- ⤴ As the player, I should be able to choose to ford a river with the possibility of losing equipment or men depending on current, depth, and width of the river and skills of the CCPs.
- ⤴ As a player, I should be able to use a compass that corresponds to 'world' north, for the benefit of navigation.
- ⤴ The airfield on Guadalcanal should be incomplete, but repairable through the direct actions of allied CCPs or the player, giving the player access to aerial reconnaissance
- ⤴ As a player, (If the airfield is captured and repaired) I should be able to request aerial

reconnaissance if cloud cover permits.

- ✧ As a Sergeant, the player should be able to command their squad within the thick of combat.
- ✧ As a Sergeant, the player should be able to give complex commands to their squad and have them intelligently followed.
- ✧ As a Captain, the player should be able to command their company of men, many of whom will not be within LOS, while leading and fighting with the command squad.
- ✧ As a General, the player should be able to command the entire American/Japanese ground force to victory from a behind the lines position.
- ✧ As a player, I should have to deal with my troopers either not being able to or just straight up not following orders.
- ✧ As a player, I should feel as if I am facing a real enemy rather than a computer.
- ✧ As a player, I should feel like I am really there, in the war, with the fate of my troops resting on my decisions.
- ✧ As a player, I should be able to make mistakes but not have this cause an immediate failure of the level.
- ✧ As a player, I should not be limited in decisions. I should be able to be as creative as possible and see how those creative decisions play out.
- ✧ When replaying a level, the player should not be able to make the exact same decisions and have everything play out exactly as before.
- ✧ When replaying a level, the aspects that are out of the player's control should not be set in stone and should not repeat too frequently (not including aspects that have very few alternate possibilities of course).
- ✧ As a player, I should have to worry about my rations and water supply as well as ammunition and weaponry condition.
- ✧ The AI on both sides should be greatly varied, soldiers should vary from incompetent cowards to courageous heroes.
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- ⤴ As the player, I should be able to press the 'W' key, and move forward, for world navigation.
- ⤴ As the player, I should be able to press the 'A' key, and strafe left, for world navigation.
- ⤴ As the player, I should be able to press the 'S' key, and move backwards, for world navigation.
- ⤴ As the player, I should be able to press the 'D' key, and strafe right, for world navigation.
- ⤴ As the player, I should be able to press the 'A and W' keys, and strafe left while moving forwards, for world navigation.
- ⤴ As the player, I should be able to press the 'A and S' keys, and strafe left while moving backwards, for world navigation.
- ⤴ As the player, I should be able to press the 'D and W' keys, and strafe right while moving forwards, for world navigation.
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- ⤴ As the player, pressing the 'shift' key while pressing the 'W' key will cause me to sprint jumping.
- ⤴ As the player, provided that I am sprinting, releasing the shift key will cause the player to move forward at normal speed.
- ⤴ As the player, movements will cease when AWSD keys are no longer depressed.
- ⤴ As the player, I should be able to move the mouse and look around my environment
- ⤴ As the player, while standing or prone, I should be able to press and hold "left Ctrl" to crouch, reducing player height and increasing relative accuracy of fired weapons.
- ⤴ As the player, while crouching, releasing "left Ctrl" key will cause me to stand up.
- ⤴ As the player, provided I am standing or crouching, I should be able to press (toggle) "Z" to go to prone, reducing player height further than crouching and further increasing accuracy of fired weapons.
- ⤴ As the player, I should be able to press the 'space' key and jump once.
- ⤴ As the player, I should have an inventory/backpack that contains objects, devices, and weapons that can be accessed in a finite number seconds once selected.
- ⤴ As the player, I should have an inventory menu key that suspends mouse-player movement and uses a cursor to rearrange items in the backpack, shirt pockets, belt loop, and hand based on desired time to access.
- ⤴ As the player, reduced levels of ambient light will impede interaction with objects in my backpack (not on my belt, shirt pockets, or hand)
- ⤴ As the player, I should be able to pickup objects to put in my backpack/inventory using the "E" key, hand, the character will "put away" the object that is already in my hand.
- ⤴ As the player, I should be able to drop objects in my hand using the "E" key.
- ⤴ As the player, I should be able to quickly select an object to "hold" from my belt/shirt/holster by using the number keys or scroll wheel (rather than navigating the inventory menu).