Bringing a Classic Board Game to the Digital World

Marmalade Game Studio Develops RISK: The Game of Global Domination for Intel® Processor–Powered All-in-Ones

By Karen Marcus

This case study examines the process that game developer Marmalade followed as it created an electronic version of Hasbro’s classic board game, RISK: The Game of Global Domination. The game plays well on desktop computers and 2 in 1s, but it really shines on All-in-One (AIO) PCs, which incorporate advanced graphics and multitouch technology powered by Intel® Core™ processors, all behind a high-definition (HD) screen. We explore the decisions the development team made regarding design, user interface (UI), and enhancing the game for the AIO experience.

Background

Several manufacturers build AIO devices, which are PCs that look like giant tablets but perform like powerful desktop computers. For traditional computing tasks, the up to 27-inch displays and accompanying keyboards support productivity. But the devices can also be laid flat on a table for gaming and other activities that take advantage of the versatile touchscreen. Some AIOs are highly portable, with a built-in battery designed to hold a charge for long periods.

Hasbro’s RISK: The Game of Global Domination is the most recent physical version of this classic board game for two to five players. Each player uses pieces that represent troops to occupy territories and continents on the game board, which depicts a world map. The object of the game, which incorporates elements of both strategy and luck, is to occupy the entire map and eliminate the other players.

Marmalade Game Studio (MGS) had been working with Hasbro for several years and recognized the reach of Hasbro’s brands. Marmalade also has a background in the mobile and connected device market and understood how much potential the AIO devices bring to that realm. With memories of playing arcade-style tabletop games in their youth, the members of the development team observed that although smartphones and tablets are becoming larger and more powerful, the screen sizes of those devices are still too small to deliver an immersive gaming experience. AIO devices, however, are large enough to explore touchscreen gaming experiences without size limitations.

The idea of developing Hasbro games for this platform came from both companies and evolved into a workable plan. The two companies and Intel worked closely together to build, validate, and design the first electronic RISK application for AIO devices.
Development Process

The starting point for Marmalade’s development was *RISK: The Game of Global Domination*, created by Parker Brothers. Figure 1 shows the components of this *RISK* version. Marmalade Producer Karla Sutherland says, “We liked this version of *RISK* because it’s inclusive and has a simple quick-start guide. In addition, it is family friendly, and we wanted our version to have a Pan European Game Information 7 rating.”

Development of the electronic version involved decisions related to design and process considerations, user experience (UX), and how to optimize the features and functions of the AIO device. The Marmalade team balanced staying true to the physical game with taking advantage of technology to improve the gaming experience.

*Figure 1. The physical RISK game*
From Board to Bytes

An initial visual design issue the team faced during the planning stage was the coloring of the map. Although they wanted to make their version as authentic to the board game as possible, they found that keeping the coloring the same after occupation detracted from a sense of reward for players. So, says, Sutherland, “Rather than make each continent have its own color, which is how it is in the board game, we removed color from the starting board and used it to represent the occupying force, which adds to the sense of tension as players’ positions in the game are strengthened or weakened.” Figure 2 shows the initial colorless state of the electronic game board and the color representation of each player’s occupation so far in the game.

Figure 2. Color used to show player occupation

A further design consideration was based on the differing stylistic elements in earlier and later versions of the physical version of the game. The team needed to determine which to bring into the electronic version. Sutherland says, “The original styling of the game included traditional Napoleonic pieces and cards set against a neutral and timeless map. The Napoleonic aspect in the board game itself is only obvious when you closely examine the pieces and the imagery on the reverse of the cards. We worked closely with Hasbro to address how the Napoleonic elements would be represented.” The team ended up giving their version a more noticeable Napoleonic feel, including an aged-looking map set against what looks like a ship’s table. Sutherland observes, “It’s as though it were in the strategic planning room of Napoleon himself.”
Ambient audio effects—such as an orchestral military theme tune, the sounds of being on a ship, menu confirmation sounds, and battle sounds—further signify the feeling of being at sea and in battle. The combination of the visual design, animated game pieces, and matching music and sound effects enhances players’ immersion in the game.

Another challenge presented itself when the team noticed that the version of the board game they were working from didn’t include missions. Sutherland says, “As game players ourselves, we were fond of the deeply strategic aspects of some of the older RISK versions and wanted to find a way to include missions in the A10 version.” As a solution, Hasbro collaborated with Marmalade to reintroduce a mission element that involves a player getting bonus troop reinforcements for trading in a card representing a region that he or she occupies.

**Optimizing the User Experience**

For the Marmalade team, the A10 design was motivating. Sutherland notes, “The intuitiveness of a touchscreen versus a mouse and pointer can be liberating for designers, but it can also be counteracted in mobile devices by the size of the screen. The A10’s bigger touchscreen freed us from that limitation.” She adds, “We liked the notion of getting the whole family together around a digital game. The idea of four people sitting around a giant tablet in tabletop mode and the implications for what you can do with game play was exciting.”

Yet, one of the first challenges the team found was engaging with 10 simultaneous touch points. Sutherland says, “It seemed like a really exciting area with endless possibilities, but we soon found out that you need to be able to distinguish who is touching the board at any given time, which limits what you can do. So, in a brief time, our excitement gave way to hard thought about how to manage this aspect.” The team recognized three possible methods for implementing multitouch:

1. Include elements that are user-agnostic—that is, it doesn’t matter to the game which player is touching which element at a given time.
2. Have only one player able to touch the board at certain times.
3. Restrict areas of the board to one player.

The team used a combination of #2 and #3. Using #3, the game includes a designated UI area for each player. This “hot corner” appears about the size of a mobile phone on larger devices (up to 27 inches) and smaller on smaller devices (down to 10 inches). The hot corner includes statistics, cards, an event ticker, and default dice location, allowing players to engage with the game and prepare for their next turn. Figure 3 shows the hot corners for the yellow, red, and green players activated.
For #2 above, when it is one player’s turn, the game recognizes that only that player is touching various points on the board, such as rolling dice and moving pieces from their hot corner to the board. The team decided to leave out #1 above because, says Sutherland, “The user-agnostic elements we discussed, such as spinning the compass needle, just for fun, didn’t add enough to the game, were disruptive, and weren’t in keeping with RISK as a game of strategy and careful consideration.” Instead, the team took the idea to another project they were developing, The Game of Life, where it fit better with the flow and general feel of the game, which is targeted to younger players who appreciate added lights and sounds. For RISK, they created a separate app to allow players to stay engaged between turns.

The companion app, RISK Strategy Companion, extends game play into nonactive times, especially for younger players who might get bored when other players take long turns. It includes strategy tips and a mobile-to-mobile secret truce feature, which is a gameplay element unique to the electronic version of RISK and highlights the socially competitive nature of the game. Sutherland observes, “In a traditional game of RISK, players may choose to side with another player, but it’s usually an unspoken thing. The companion app takes this a step further and offers players a way to discretely communicate an intention to attack another player. Players should beware—truces can be broken at any time!”

The team also needed to consider the point of view that would work best for players viewing the game on an AIO. They wanted to incorporate zoomed-in views but realized that this effect doesn’t benefit all players at all times when they are sitting around the game in tabletop mode. They discussed the possibility of a constant birds-eye view. As a compromise, the game is in birds-eye view most of the time, but during battles, the view zooms in for short bursts of
action in which the game pieces actively shoot their guns and cheer if they win the battle. Figure 4 shows the zoomed-in view during a battle between the yellow and red players.

Figure 4. Zoomed-in view during battle

Another element introduced to the Marmalade version of the game is a single-player option. Sutherland notes, “In the physical version, you need a minimum of three players to be able to play an effective game.” A single player can make a game of up to four players with any combination of real or artificial intelligence (AI) players. The team created five levels of AI with differing styles of play and aggression. Sutherland comments, “We tried to imagine each general with a personality and ‘style’ of play that had recognizable traits so that each could easily be part of a game alongside human players.” The AI levels are:

- **AI1—The Steady Opportunist.** Not a great strategist, AI1 attacks only easy neighboring territories and slowly makes its way across the board.
- **AI2—The Frenzied Approach.** AI2 attacks at random, mostly where it thinks it can win, and will always try to get a card.
- **AI3—Vindictive.** AI3 goes for the player who went after it but looks to cluster and build from a central core.
- **AI4—Builder.** AI4 builds from the back. It gets a base (ideally, an entire continent), and then builds from it. AI4 doesn’t take many risks and is a solid defender.
- **AI5—Aggressive Builder.** AI5 builds like AI4 but is more aggressively minded. It will nip at wholly owned continents and sweep through continents more quickly and efficiently, defending only the required borders along the way.
The default game mode is “global domination,” in which play ends when one player occupies the entire world map. Because the game can take several hours to play, says Sutherland, “We wanted to offer a short game option of around 15 minutes with a fast start.” So, in the game setup, players can select a fast mode that assigns victory to the highest-ranked player after five rounds. The ranking is determined by the number of territories, troops, and continent bonuses. Other options that increase the speed of play are also set to engage in this mode, including automatically randomized army placement. This option can be further customized with the inclusion of bonus troops for territory cards (missions) and the instant cease fire card, which ends the game immediately, if drawn.

A “house rules” setting enables players to customize settings as they have the freedom to do when playing the traditional board version. Sutherland says, “It helps players tailor the experience to their favorite style of gameplay, and it makes setup faster.” Figure 5 shows the setup screen with the fast play and house rules options.

![Setup screen with fast play and house rules](image)

**Figure 3.** Setup screen with fast play and house rules

**Implementation for All-in-Ones**

The challenges for designing a game specifically for AIOs revolved around how best to take advantage of their unique features, such as tabletop (lying flat) mode, camera angle, and perspective for players around the board, while meeting players’ expectations for enhanced game play on a digital platform.
One of the first considerations for optimizing the game for A10s was the mode of play. Because an A10 can be used like a monitor with a keyboard and mouse or like a tablet flat on a table, the team created two versions: one in desktop mode, the other in tabletop mode. With either version, players can use a “pass-n-play” option, which has all the visual elements facing one way at all times and allows only one player to interact with the game at a time. The pass-n-play option also works well with smaller devices like 2 in 1s. Aside from the input method, all elements of the two games are the same.

The team took advantage of the computing power of the A10 device by developing high-resolution asset sets designed for larger screens. Sutherland notes, “Processing power was never a bottleneck, which was a real bonus. We ran physics, AI, three-dimensional (3-D) rendering, and simulation modeling without any performance concerns at all. So, the games look their best on these devices.”

The multitouch features of the game include simultaneous dice rolling for attacker and defender, initiated from each player’s hot corner, and the ability for players to use their hot corner to look at cards, game statistics, and options while other players are moving pieces on the board. As shown in Figure 6, players can also use the touch element to manually drag pieces during the reinforcement phase or at the end of an attack.

Figure 4. Players can drag pieces.
**Development Environment**

To develop their version of *RISK*, the team used the software development kit (SDK) developed by Marmalade Technologies Ltd., the parent company of MGS and Microsoft Visual Studio*® 2013 on Windows*® 8 desktops. Sutherland explains the reasoning behind the decision to use the Marmalade SDK: “It has a flexible approach to development that made it easy to introduce new technologies, and it’s an ideal SDK for developing for touchscreen devices. Further, as a C++ SDK, the resulting code is fast and optimized, meaning that we could deliver a fantastic game experience on a broad range of hardware. Finally, we were able to integrate other tools and utilities easily thanks to Marmalade’s open architecture and C++ support.”

Because it comes with the required tool chains, graphics middleware, and resource pipelines, the Marmalade SDK enabled the team to get up and running quickly. “These are the kinds of things that take a team time to set up if they use native development tools,” says Sutherland. “We got to a first playable game relatively quickly, so we could spend our time on the UI/UX, game play, and features rather than implementing tools and technology.”

The Marmalade SDK is traditionally a mobile development environment, but Marmalade’s studio and engineering teams worked closely and found that they could scale to a larger device, such as the AIO. Sutherland notes, “Because we did it with the *RISK* project, the SDK is now well placed as a development tool for other AIO development projects.”

During the quality assurance (QA) cycle for this project, the team had to think about both the Windows desktop and Windows Store versions of the game. Sutherland says, “We had to account for desktop usage of the devices, ensuring that all UI touchscreen interactions could be done using a mouse, as well.”

In addition, the team had to incorporate a wide range of new screen sizes and resolutions. Sutherland observes, “The Marmalade SDK simulator allowed us to configure a representative screen size for each target, but we also wanted to test specifically on each device, to see how the multitouch features translated between large and small screens. Because of this, the QA process took longer than on other projects.”

**Challenges and Lessons Learned**

The biggest challenge the team encountered while developing their version of *RISK* was the fragmentation in both screen resolution and screen aspect ratio. Sutherland explains, “Our target devices ranged from 10-inch tablets to 27-inch AIO devices, with resolutions from 768p through 2160p Quad HD. We also saw different parts of the screen being reserved for systems information on different devices, all of which introduced additional complexity.”

The team had to create several asset packs to ensure that the UI scaled correctly, and this required several iterations of UI design to make sure the game looked and functioned correctly on all devices. Sutherland says, “We found that we also had to add a simple optimization screen on setup for the user to set the screen configuration parameters.”
Based on the learning curve on UI implementation and the platform gleaned from the development of *RISK*, the team gained a head start on future projects for making the UI design more intuitive. Sutherland says, “It would also be interesting to look at existing and original game concepts that can make even more use of simultaneous touch, with naturally designated screen areas of inputs for each player as part of the core design. We would like to see how far we could then go with designs that require super-fast recognition of simultaneous touch points, such as during frenetic match play.” Figure 7 illustrates the *Grab the Cash* minigame from *The Game of Life*, also created by Marmalade. In this minigame, each player has his or her own touch area and is frenetically tapping to move his or her piece to capture bank notes—while avoiding bills—to get as much money as possible before the timer runs out.

**Figure 5.** *The Game of Life* minigame, *Grab the Cash*

The Marmalade team has put some other lessons learned during the development of *RISK* into use. The camera and player positioning issues led them to change their approach when developing *Scrabble* and *The Game of Life*. Says Sutherland, “For *Scrabble* we locked the user into birds-eye view at all times. Without any 3-D elements to be shown off by a lower camera angle, it wasn’t needed. For *The Game of Life*, we originally had follow cams following the piece on the board through a 3-D world. A fast-moving camera oriented to one side of the board became distracting for other players in tabletop mode, so we left that in birds-eye mode and used the follow cam for pass-n-play mode.”
User Testing

The testing process required three games in development to be tested simultaneously and to have multiple players for each game. The testers worked on four main devices:

- A 2 in 1 with 768p resolution
- A 2 in 1 with 1080p resolution
- An AIO with 1080 x 1920 resolution
- An AIO with 1600 x 900 resolution

All devices were tested with Windows 8.1, which is a requirement for running the RISK game.

During the testing phase, the team was surprised by some of the players’ responses. Sutherland says, “We didn’t expect that some players would think the board would be movable, while others thought it would be locked. The same was true with viewing and camera preferences. As a result of our research, we found a happy medium for how controllable the board should be. Players can zoom in and out, put it in isometric or birds-eye view, or use two fingers to rotate it to face them or another player. All of these actions can take place without detracting from game play.”

Generally, reviews from testers were positive. Sutherland says, “We have had good reviews when players were familiar with the game and had clearly played other versions. Some reviewers said it’s the best version of RISK ever, and we got a few comments that it’s a great value, given it does everything the board game does at one-fifth the price (after purchase of a compatible device). It’s great to know that players like our version and interpretation.”

Summary

Game developer Marmalade took on the challenge of creating an electronic version of the classic board game RISK, optimized for AIO devices. As game players themselves, team members wanted to stay true to many aspects of the classic game, but they also needed to ensure that the game would be appropriate for electronic game players and would in some cases include enhancements made possible by technology. Decisions related to game play methods and board design incorporated these considerations.

The team also considered elements specific to AIO devices, such as multitouch, high-resolution graphics, and high-power computing, and created elements that took advantage of the features and functions of AIOs.

The SDK developed by Marmalade’s parent company worked well for development in conjunction with Visual Studio 2013 and Windows 8. The Marmalade SDK is traditionally used for mobile implementations, but the team incorporated it for use with larger devices. Two versions of the game (for Windows desktop and Windows Store) plus a range of screen sizes and resolutions made the QA process lengthier than usual, but the team is now well positioned to use lessons learned in future game development projects.
For More Information

- Marmalade: https://www.madewithmarmalade.com
- RISK in the Windows Store: http://apps.microsoft.com/windows/en-us/app/risk-the-game-of-global/d1a789ce-7ca9-4c82-a34d-52ca6c0bc47

About Marmalade

For 16 years, Marmalade Technologies Ltd. has been providing game makers with open, powerful, high-performance tools such as its world-class SDK, which enables developers and artists to make native code run fast on as many devices as possible.

The Marmalade SDK is an award-winning cross-platform development tool that has a C++ core and additional modules for Lua*, HTML5, and Objective-C*. With Marmalade, developers can deploy their projects to all major mobile, TV, and desktop platforms from one codebase without compromising on reach, performance, or creative vision.

MGS, a division of Marmalade Technologies Ltd. creates world-class titles specifically for mobile and connected platforms. Working within existing franchises or on original intellectual property, MSG creates engaging apps to any specification.

For more information, visit the company’s website at www.madewithmarmalade.com.

Marmalade will be showcasing RISK at GDC 2015 in March. Please come to stand 930 to take a look!

About the Author

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