

# **EXHIBIT 1**

# Viability and Value of Game Controller Features

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## I. Introduction

The purpose of this report is to examine and assess the value of various specific features found on certain Video Game Controllers, specifically looking at the specific features of Vibration Feedback and Six Axis Control. These features have been incorporated into controllers to enhance the game player's enjoyment of various video games.

Game controllers are handheld interface devices designed to allow the game player to interact with video game. It is generally an input device, i.e. a means of the game player to give commands to the game but it can also be an output device in which the game will communicate with the game player.

The Vibration Feedback system is an example of the latter. It is a mechanism that vibrates the controller in the game player's hand. This is used both as feedback to events occurring in the game and as a secondary mechanism of contributing to the mood and atmosphere of the game.

The Six Axis Control allows the game player to control 3D related objects through control of 6 orthogonal axes. For example, displacement along the X, Y, and Z axes along with rotation along all three axes. This gives the game player a natural and powerful control of the game action.

## II. Games and Interface

Video and computer games have evolved a great deal since the simple games like Pong first appeared on the audience's televisions. Today, they are a complex and powerful media, capable of art and entertainment that is as far reaching and popular as more traditional forms of entertainment like film and theater. This is exemplified by the total sales in the industry exceeding \$17.9 billion dollars. In contrast, total film box office sales for 2007 were \$9.5 billion. (Bangeman, 2008)

In many ways, video games have similar mechanisms of entertainment when compared to film or television. There is a strong usage of graphical animated images utilizing character, background, staging, plot and story. In addition, both use strong use of sound and music. Games utilize the same sets of tools, sometimes to much greater extremes. For example, the soundtracks for some games extend into several hours, much longer than the equivalent film.

Given the similarities, there are some strongly unique differences in the game media. While most entertainment requires that the audience passively receive the work, the video game is unique in that the audience is required to take an active part in the entertainment. The appeal and power of games when compared to other entertainment is that the audience is taking an active part in the story.

This ability for the audience to take an active part in the game's story and play is that unique feature that allows games to compete, and compete successfully with more traditional media. It is a powerful mechanism of engagement drawing the game player strongly into the creative work, and providing much of the entertainment.

In order for the game audience to interact, the audience must communicate with the game while the game must communicate with the audience. Interface is the general label describing these communications. The clearer those communications, the more precise and natural, the more the audience will be engaged and the greater the success of the game. This is done through several different mechanisms. There are three primary methods of communication, the television (or video) screen, the sound /speakers, and the controller. The first two are used primarily as a mechanism of the game communicating with the audience, and the latter is the primary mechanism that the audience communicates with the game, thus creating interactivity.

This makes the design and usability of the controller critical to the success of games. The need for effective controllers is necessary both in competition to other games and game platforms; and in competition with other media. A \$19 billion industry depends on the nature and effectiveness of the controller.

Akio Ikeda, an engineer at Nintendo who helped develop the Wii controllers, reflects this importance when he said: "Well, after all, this is the thing that is closest to those who play the games. So, I believe that it should rather be a part of the body than a part of the game device. Our customers -- since our customers overwhelmingly have more opportunities to be touching the controller and UI [user interface] than touching the game console, I am always aware of how important it is." (Ikeda, 2008)

Through the years controllers have evolved just as games have evolved. The simplest controllers, for example the Atari 2600 controller, had a digital 4 direction joystick and a single push button. This was adequate for the simple games of those times. But both as games evolved in complexity, and the user desired a more integrated and natural way of communicating with the game, joysticks themselves needed to evolve. So in contrast to the Atari 2600's controller, the controller for the Xbox 360 had two analog thumb sticks, a directional D-pad, bumper buttons, two analog triggers, a Guide button, other game buttons and vibration feedback.

While it is possible for the game designer constrained to the simplest controller to find a means of the game player to communicate with the game, the designer is looking for much more than basic communication. **Instead the designer is looking for a natural intuitive mechanism of communication between the game player and the game. The more flexible the controller, the more options the designer has in achieving that goal.** (K. Koshiishi deposition, 43:8-43:25) An example of this can be found in the genre of boxing games. The game player is typically asked to control a number of various jabs and punches with the strategy of the game being in making the correct punch at the correct time. Typically, this is done with buttons, each designated to a certain punch, or possibly a button sequence to control a special punch. Electronic Arts in *Fight Night 2004* found a new solution to the problem. Instead of buttons, the analog joystick was used for the game player to designate the different punches. By rotating the joystick in a natural and obvious pattern, the equivalent punch was enacted by the player's avatar (Barry, 2005).

The point here is that the designers of the analog joystick did not envision this use of the controller. However, they did realize the importance of flexibility of the design of the controller, thus allowing to the creators of *Fight Night 2004* to incorporate an innovative use of the analog joystick and thus improve the playability and value of their product.

### III. Designing for Controllers

The individual responsible for the design of the game, and how the video game will entertain is typically known as the game designer (or designers). This is the creative focus of the game development process in a similar way to the director in film or theater. The entertainment value is his final responsibility.

As mentioned previously, how the controller is used to communicate with the game and for the game to communicate with the audience is a critical part of this entertainment value. One can consider the controller to be a technological tool that allows the designer to implement this communication. It adds to the designer's palette of tools in which he entertains and tells his story.

A comparison can be made here to other forms of art and entertainment. Consider the movie director and film. One of the tools available to the modern director is color film. The director can decide to use color or not and even has a great deal of control of the nature of the color he uses. This 'tool' in the director's storytelling palette has not always been available to the director. The technology only became available in the 1930s. Still, even before the existence of color, great and popular films were constantly being made. Yet color has since become an absolutely necessary technology option for creating films. Still, this is an optional tool because even today, some films are made in black and white. Typically this is because the director feels he can tell his story more effectively in a specific case without color. **A key point here is that while color is not required to make great movies, it obviously is a powerful tool in the director's palette.**

This analysis applies as well to specific features found in the game controller. The original controllers came with minimum features and types of control objects, but as the technology improved, new controller features were added and then given to the game designer to add to his storytelling palette. And as in color for film, each feature while valuable, is optional to the designer with some designers using the feature and other designers using other features.

No feature in a controller is absolutely necessary, any game could be written to use the most basic original controllers. But a game with such a restriction would probably be a poorer work of entertainment.

Note here that creating games are a very expensive process. It cost money to develop a game to support any specific feature on a controller. This is not a minimal process but instead an extensive process of design, development and testing. A controller feature will not be used unless the designer feels that the cost of using that feature is justified in improving the quality and value of the game. As such, the very act that a game uses a specific feature is ipso facto proof that the designer of the game believed that its use was valuable to the game.

In a like way, the physical existence of a feature on a controller is evidence that the console manufacturer felt that the feature would be worth the cost of its inclusion. As such, any specific feature used in a game, or designed into a controller must be worth the incremental cost of including that feature. For example, Mr. Koshiishi of Nintendo testified that the rumble feature was relatively expensive, and yet Nintendo still included it in their product lines. (K. Koshiishi deposition, 42:7-11, 42:20-43:6). See also Deposition of Harrison At 48:10-22 (stating that Nintendo was trying to develop the theme that it "[does not] believe in adding costs that consumers aren't necessarily willing to pay for."). I have also reviewed Nintendo's and Microsoft's interrogatory responses regarding non-infringing alternatives to the '700 patent. However, the parties do not specifically identify any non-infringing alternatives. To the extent they do I may supplement my report based on their supplementations.

In addition, there are indirect costs to the act of adding a specific feature. A feature potentially adds complexity, something that is not desired in any game. This is described beautifully by Ramachandran when he says "There are a number of factors to consider when designing the player's controls; perhaps some of them many gamers do not know of. Mood, tactile interaction, demographic and focal interest are all important factors when considering the control method for your game. Addressing each in order could mean the difference between beautiful intuitive controls, and a jumbled, frustrating mess." (Ramachandran, 2008)

Armstrong, and other game controller developers, recognizes that game controller technology can be implemented in a host of different ways, but the implementation of that technology can affect whether the controller is accepted by the market. Genyo Takeda, a board member at Nintendo, [1] recognized the importance of the "touch and feel" of a game controller, in determining how to construct a controller. Takeda Tr. at 64:2-65:7, 67:9-11; [2] see Ikeda Tr. at 44:21-45:17 (stating that, although the

same game can be played with different controllers, the enjoyment derived from playing with one controller may differ than if playing with another controller).

To summarize, specific game controller features add to the game designer's ability to create popular and effective entertainment. The use of a specific feature is tied directly to the nature of the game and what the designer is trying to accomplish. It's a creative decision in the same way that using color can be a creative decision in film. It's never necessary (although some designers might argue differently), but the quality and value of each game is directly related to the availability of the palette of features and tools.

#### IV. Six Axis Control

Over the years, video games have undergone a major shift in the point of view of the game player. Originally, game play was in a 2 dimensional world. Some of the first games like Space War! (1961) or Pong (1972) were 2 dimensional representations of 3 dimensional play fields (space and the tennis court). But people do not live in 2 dimensional worlds, and soon there were experimentations with placing the game in a 3 dimensional world which allowed the game player both more options, and a more familiar environment in which to relate to. Because of this huge advantage to relating the game player to the game, currently almost all games take place in 3 dimensional environments.

This brings the question then of how the game player can control graphics and characters within a three dimensional world. Especially in worlds which where the graphics and characters are not restricted to a surface (i.e. walking on the earth) but instead require 3d movement (flight simulations, camera motions, space games). Compounded to this is the fact that a body or person generally not only engages in translation (i.e. go from point A to point B), but also engages in rotation (i.e. turn around). How does the game player tell the game exactly what he wants to do?

There are a number of solutions to this problem, each having varying advantages and disadvantages. The key problem is to give the game player a naturalistic and intuitive means of communicating their 3 dimensional desires of movement to the game. For example, how does the game player tell an astronaut working on the International Space Station to go over to the solar panel and then turn around and look where he came from?

Six axis control systems are an effective solution to this problem. Either through one or more separate control objects, the controls are directly interpreted into the 6 primary axis of translation and rotation.

For example, Mr. Ikeda of Nintendo filed for a patent in Japan which purports to be a solution for needing a "high degree of freedom" in a game console. (Ex 310 to Deposition of A. Ikeda). And Nintendo advertising further supports the solution discussed in Mr. Ikeda's patent application (Ex. 280 to Deposition of Harrison). As another example, Microsoft documents which discuss the problems Personal Computers have competing with consoles also support the contention that multiple axes of

control are necessary to compete. (See e.g. MSANAS21172-75). See also Deposition of Harrison At 39:22-42:1 (suggesting that availability of controller features affects options available to a developer, and that having two analog joysticks is helpful for 3D games).

Because of the naturalistic mapping of the controls into translation and rotation, the game developer is freed of developing a complex and non-intuitive control structure that would confuse and frustrate the game player. The power of such a control system is to draw the game player into the world so they feel there is an active part of the story taking place in the game.

Furthermore, the increased functionality of a 6 axis controller can also be used in other diverse control feature sets. The existence of a more complex control system allows for a large degree of variation in the controls used for any given game. For example, it is helpful to be able to move multiple things, rather than one object on six axis. Genyo Takeda reflected this when he said: "This need to be independently controlling, multiple moveable objects on a TV screen, so the body may move forward or the neck moves in other direction or, for instance, the body may move one way while the pistol held in the hand may move another way. So there's this need in video games to have independent control. So, we wanted to be able to satisfy both those new gaming participants as well as what we call gamers, those who are very used to playing games. So, we wanted to present the product as something simple, while at the same time have complex controls, independent controls that will allow manipulation of multiple objects." (Takeda, 2008) See also, Deposition of Harrison at 61:11-20, 70:13-71:23 (emphasizing the importance of a large number of hardware features for developers to use in creating games, and that the hardware can affect whether developers choose to develop games for each system).

## V. Vibration Feedback

Vibration feedback systems serve a somewhat different purpose than do Six Axis Controls. While the Six Axis Controls are primarily about allowing the game audience to communicate with the game, vibration feedback is primarily a game to audience communication.

Vibration feedback generally gives two forms of important communication, informational and atmospheric.

During the play of the game, the audience is loaded with a great deal of information. At minimum, there is the visual communication through the screen along with audio communications. The communication bandwidth, while fairly wide, still has limitations. And since most games work under high pressure time constraints, the game designer is continually looking for mechanisms to both get beyond the bandwidth constraints while clearly and naturally delivering those communications.

The vibration mechanism is such a communication channel. It makes use of a new channel that is neither visual nor audio, but instead is tactile in nature. This signal to the game player is therefore

immediate and obvious. Another example of tactile feedback is “passive tactile feedback” such as dome capped buttons. These buttons act to inform the user of the controller whether they are pressing or releasing any given button with the feature.

An example of use of vibration feedback might be a race car game. If the car the audience is driving drifts off the track onto the shoulder, the controller would vibrate. This not only communicates to the game player that the vehicle has veered, but it’s a completely naturalistic and obvious signal since in real life, the car would vibrate more when leaving the track. Some systems may also use the vibration feature to designate specific menu selections.

The second form of communication is that of atmosphere. Games like any entertainment or art necessarily need to communicate the feel of the world in which the game player is engaged. For example, if the game is taking place in a dark and dank jungle, the art needs to communicate to the player’s eye that dark and dank jungle. Not only is atmosphere created by the images of jungle, but it is also created by how those images are drawn and colored to create the atmosphere of dankness. In a like way, the audio would be designed to create the same form of mood. A large part of the resources in any game are invested in establishing and maintaining the desired mood for the scene.

Vibration feedback is a very useful tool for enforcing mood. The mind interprets tactile feedback almost unconsciously, taking it directly as part of the environment. Therefore the designer can use vibration feedback to reinforce the game atmosphere. An obvious example is a game where the player is in the middle of a combat situation. Explosions and combat fire with screen and audio will take the game player into the middle of the action, but the use of vibrations synced with the events going on the screen strongly reinforces the feel, thus engaging the game player to a much greater extent. For example, Microsoft investigated a number of features related to gaming and determined that “there will be continued need...for rumble.” (See e.g. MS-ANAS 21158-21181). Mr. Penello of Microsoft also testified that “people like rumble.” Deposition of Penello at p. 30.

Perhaps the lack of a feature is a better assessment of its value than the actual feature. When Sony released the PS3, it removed the vibration feature that it previously had on the PS2. This brought out an outpouring of negative reviews. As an example, an AP article reviewing *Resistance: Fall of Man*, the reviewer said after a rave review “Too bad the PS3 controller doesn’t offer any rumbling ‘forced feedback’ (as with its PS2 predecessor) as it’s sorely missed in this gritty action game.” (Associated Press, 2006). A New York Times review had a similar tone when it said “Ridge Racer 7 is a well-made racing game that suffers from Sony’s unfortunate decision to remove the vibration function from its controllers.” (Herold, 2006). See also, various articles complaining about the loss of rumble features (MS-ANAS 141891 - 141892) and a study regarding the use of rumble in various types of games (MS-ANAS 141771 - 141781). See also, Nintendo’s Meeting on Next Generation Controller Ideas discussing the need for rumble (Exhibit 285 of Harrison Deposition). In contrast, Microsoft recognized the need for vibration feedback for the Xbox as early as 2000 (MS-ANAS 158899 - 158902).



This feature is of recognized value both to designer, and the audience themselves. Certainly, based on reviewing comments, loss of such a feature created negative press.

## VI. Simplifying Control

There is almost a counter intuitive process going on with the technological development of controllers. While controllers are gaining functionality and complexity, the goal for the hardware designer and the game designer is actually the simplification of control for the game player. The reason for this seeming contradiction is that the games themselves generally require complex commands, yet the game must allow the game player to be as unaware as possible the actual control mechanism. This is because the challenges the game player faces should be those of the game, not the controller.

Complexity in the controller itself therefore removes the need for the game player to learn complex input patterns. This then results in an actual simplification of control. Six Axis Control is a perfect example of this. Prior to implementation of such controls, the game player would have to swap between rotational and positional control states, and have to always be aware of the current state the control system is in. When the game player would forget this status, or misunderstand his current status, he would make game mistakes that were not his fault directly, but instead a fault of the control system. This then damages the game's value as entertainment. Something always to be avoided from all parties points of view. With the implementation of six axis control, the problem is greatly reduced allowing the control system to absorb the complexity of input from the game player.

This can be quite critical. While in other entertainment forms, boring the audience is one of the worse 'crimes', with games frustrating the audience is one of the worse 'crimes'. In an article on User-centered Design in Games, the authors say: "Without learnable and intuitive controls, the user will make frequent mistakes translating their desires into onscreen actions. We have seen consistently that these kinds of mistakes are enormously frustrating to the users, because learning to communicate one's desires through an 8-button input device is not very fun." (Pagulayan)

**Simplification while retaining flexibility and power is an absolute necessity for today's controllers.** The result of this simplification is the game engages the player to a greater degree, creation a more powerful entertainment and thus more value for the audience.

## VII. New Implementations

One of the values of complex control items is the flexibility the multiple features give to the game designer. This allows for the process of emergence where new and unplanned uses for the controller can be developed. J. Nordhagen expressed this when he said: "Trying to shoehorn existing genres into the controller concept is not the exciting part of the new system, although I don't doubt we'll see

some excellent interpretations of things like RTS [real time strategy] games. To me, the promise of the new controller is that it allows new types of games. The question that should be asked is not "How can we do what we've been doing on this controller?" but rather "What does this controller allow that was not possible or not elegant previously?" (Nordhangen, 2006)

Manufacturers are aware of not only the past needs of controllers but the future unknown needs of designers for their controllers. The competitive nature of the video console industry requires that the controller must be designed for new implementations of their hardware. As such, the most powerful, flexible and natural controller is essential to each manufacturer. Deposition of Harrison Tr., 27:1-16 (stating importance of hardware to be able to adapt to future technology).

Both six axis and vibration systems are not only for the support of current games, but also for the support of future innovations in the game industry. As such they are essential to the manufacturer's future sales.

## VIII. Conclusions

In this paper, I have examined both the nature of controllers and how they are critical to the video game industry. Two of the most important innovations in controllers have been the advent of six axis control and vibration feedback. Both are very powerful tools that are invaluable to the development of new and powerful games in one of the fastest growing and largest entertainment media in the world today.

I have further reviewed example video clips of games produced in this case. Those video clips include Dead or Alive Beach Volleyball for the Xbox, Dead or Alive 3 for the Xbox, Project Gotham Racing 2 for the Xbox, Halo 3 for the Xbox 360, Super Mario Sunshine for the GameCube, Blazing Angels for the Wii, Crimson Skies for the Xbox, Kameo for the Xbox 360, Hitman for the Xbox 360, Zelda: Twilight Princess for the Wii, Madden '08 for the Xbox 360, and Super Mario Galaxy for the Wii. These games represent many of the diverse features that I have discussed in this report.

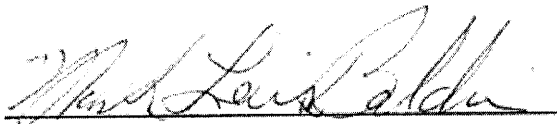
## IX. The Author – Mark Baldwin

Mark Baldwin is an expert witness employed by Round Table Group, Inc. in support of McKool Smith, P.C. . Mark Baldwin is a long time computer game designer, developer and manager. He has a Bachelors and Masters in Engineering from Purdue University. His first published computer game was in 1982. Since then he has written, programmed, designed, directed, and/or produced over 30 commercial computer games and has won numerous awards including "Game of the Year". He also founded several game development companies including Quantum Quality Productions and White Wolf Productions. Mark is currently teaching computer game design and development for several schools, as well as providing consulting services on computer game design, development and management for both

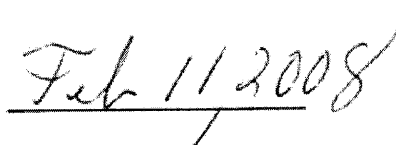
commercial companies, academia and the United States military. Mark's web site is <http://baldwinconsulting.org>.

## X. Details of Engagement

I am being compensated at a rate of \$120 per hour for my work on this matter. My compensation is not contingent upon the outcome of this litigation or the opinions expressed herein.



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