

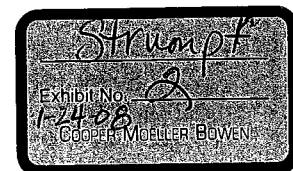
# EXHIBIT E

(MDY's SDF)

**Expert Report on The Impact of Glider on World of Warcraft  
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## **I. Introduction**

This document is a response to the defendants' expert report "Effects of Botting on World of Warcraft" by Edward Castronova. The defendants' report makes several claims about how MDY's Glider program negatively impacts the World of Warcraft (WoW) game and damages the finances of Blizzard, its seller. The report also attempts to quantify the annual level of these damages.

This document will show that the defendants' claims of damages are wholly unfounded. I will show that each of the specific harms listed in the defendants' report is either inconsistent with the facts, based on unsupported assertions, or is not the fault of Glider. None of the defendants' arguments are based on empirical data or generally accepted methods of calculating economic harm. The defendants do not provide any evidence at all which is specific to the Glider product.

Aside from responding to the specific points in the defendants' report, I also show that there are no overt signs that WoW or Blizzard are currently being harmed. Blizzard itself is extremely profitable. The game has a far larger user-base and is growing much more rapidly than any of its competitors. If Glider were causing significant harm, WoW would not be outperforming its competitors. This is because Glider only operates within WoW.

In total there is no convincing evidence that Glider causes any damage to either WoW or to Blizzard.

## **II. The Prima Facie Case for Damages**

The defendants' expert report argues that the Glider program has significantly damaged the quality of WoW and has imposed economic damages on Blizzard. Before considering the details, there are two main reasons to be skeptical of this claim. First, it is inconsistent with the phenomenal success of WoW. This game has the most subscribers and fastest growth rate in user-base among its competitors, and it is highly profitable. Second, it ignores the fact that there are very few Glider users. Currently, Glider

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represents less than one-half of one percent of WoW users. It is hard to understand how this small number of users could impose significant harm.

Before turning to the particular numbers, it is worth emphasizing that since its inception the Glider program can only be used on WoW and not on any other competing gaming environment. This means that if Glider is imposing harm, it should be evident in the performance of WoW relative to its competitors. As I will show below, WoW and Blizzard are doing far better than its competitors. This is inconsistent with Glider imposing harm.<sup>1</sup>

To begin, consider the financial success of WoW. As of December 2007, WoW has over 9.3 million paying subscribers who each pay Blizzard \$15 per month. For 2007 as a whole, Blizzard had revenue of \$1.110 billion and operating profits of \$517 million. These financials are among the strongest in the video-game industry. The future prospects for Blizzard are bright enough that Activision, one of the leading makers of console video games, agreed to be purchased by Vivendi Games, Blizzard's corporate parent. If Glider were imposing significant harm on Blizzard, it is hard to understand this extremely favorable financial numbers. Glider is not used on any other game, and yet Blizzard remains the "industry crown jewel."<sup>2</sup>

Another way to see WoW success is in its user-base. WoW is far larger and has grown faster than any other for-pay massively multi-player online role playing game (MMORPG). The figure below shows the monthly number of subscribers for each MMORPG with at least one-hundred thousand paying users as of October 2007. Two facts are clear. First, WoW is far larger than any subscription-based MMORPG: its nearest competitors (Lineage and Lineage 2) are less than an eighth its size. WoW accounts for over sixty percent of all paying MMORPG subscribers (WoW has 9.3

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<sup>1</sup>To determine economic damages, one should compare the observed outcomes against the counterfactual of what would have happened if Glider had never been introduced. While the latter cannot literally be observed, it can be approximated using the performance of the competitors who are not directly impacted by Glider.

<sup>2</sup>This quote, as well as all of the numerical values listed in the paragraph come from the document "Activision-Blizzard: Worlds' Largest, Most Profitable Pure-Play Video Game Publisher," available at [http://www.sec.gov/Archives/edgar/data/718877/000110465907086657/a07-30510\\_6425.htm](http://www.sec.gov/Archives/edgar/data/718877/000110465907086657/a07-30510_6425.htm), last accessed on 2 January 2008.

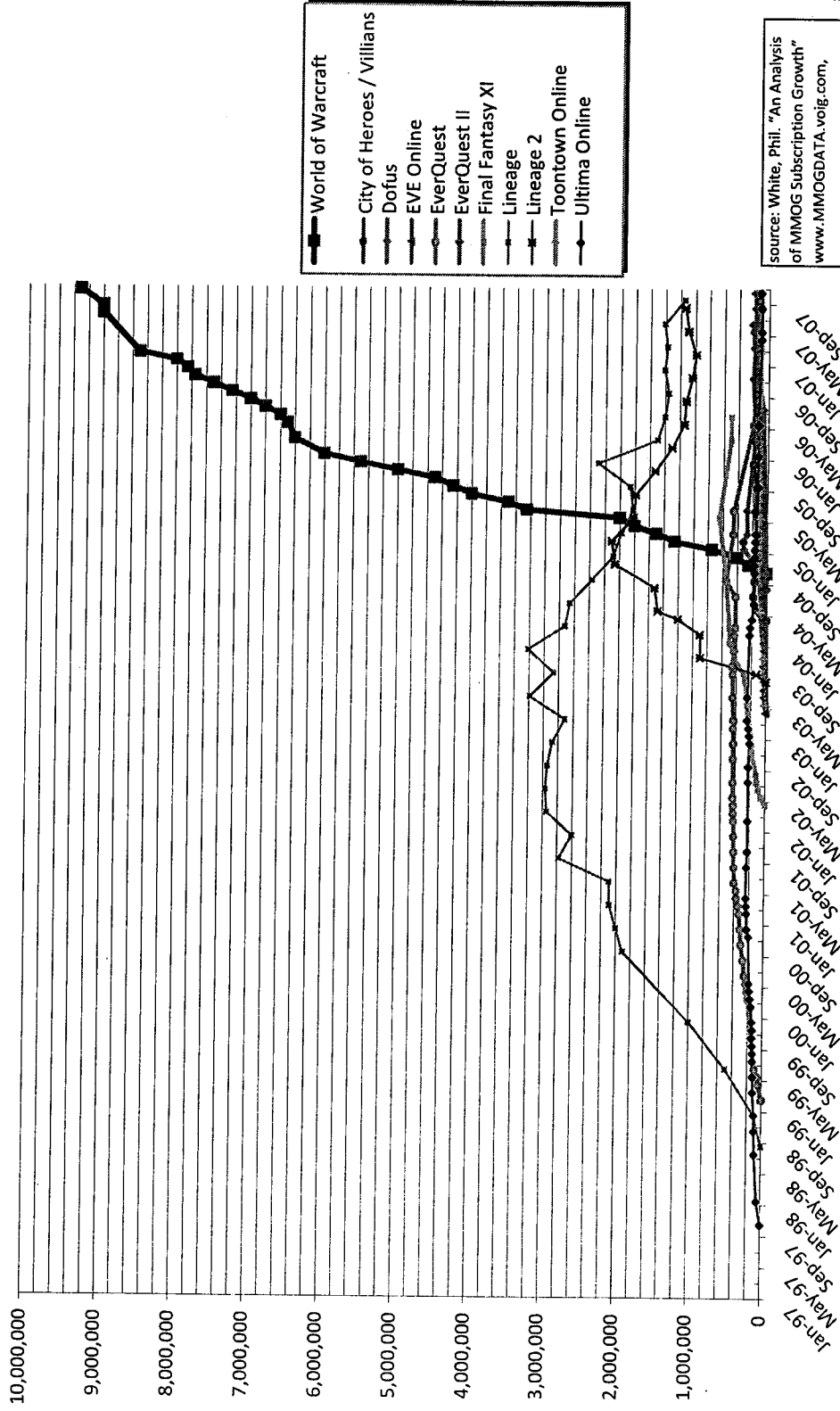
million subscribers while the industry as a whole has about 15 million). Second, WoW has been growing faster than almost every other MMORPG. As the table below indicates the number of WoW subscribers has increased by over 6 million – nearly tripling-- since Glider was first released in June 2005. In contrast, the number of paid subscribers significantly shrunk at almost all other large MMORPGs (the only two which grew were quite small, roughly one-one hundredth as large as WoW). To put this in perspective, WoW added 1.8 million subscribers in the last year, October 2006 to October 2007. This increase is almost twice as large as the *total number* of subscribers of the second largest MMORPG.<sup>3</sup>

Simply put, there has never been another MMORPG whose size or growth has approached that of WoW. WoW is both attracting new players and retaining those who were already subscribers far better than its competitors. It is hard to understand this if Glider is significantly diminishing the attractiveness of WoW.

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<sup>3</sup>The data on the number of users is from <http://mmogdata.voig.com/> (White, Phil. "An Analysis of MMOG Subscription Growth" accessed 18 December 2007) and updated via a personal communication with the webmaster (Phil White email dated 18 December 2007). The website contains extensive documentation on the data sources. Note that the figures omits Runescape and Lord of the Rings due to the limited availability of data.

# MMORPGs with At Least 100,000 Paying Subscribers (1/1997-10/2007)



MMORPG	Current Number of Subscribers	Change In Subscribers: June 2005 - present	
		% Change	Absolute Change
World of Warcraft	9,300,000	186.2%	6,050,000
Lineage	1,143,699	-37.4%	-682,524
Lineage 2	1,132,405	-37.6%	-682,141
EVE Online	195,000	236.6%	137,071
EverQuest II	185,000	-33.5%	-93,000
City of Heroes / Villains	139,313	-14.5%	-23,609
EverQuest	135,000	-70.3%	-319,000
Ultima Online	110,000	-29.9%	-47,000
Toontown Online	103,000	3.0%	3,000

**Number of Subscribers and Growth Rates Since the Introduction of Glider (all MMORPGs with at least 100,000 subscribers in October 2007)**

source: White, Phil. "An Analysis of MMOG Subscription Growth"  
[www.MMOGDATA.voig.com](http://www.MMOGDATA.voig.com).

notes: Current values are for October 2007 (or September 2007 if that is the most recent data available). MMORPGs with incomplete data (Dofus, Final Fantasy XI, Lord of the Rings Online, Runescape) are not listed.

The second point to emphasize is the small number of Glider users. Over the period 1 November through 14 December 2007, there were 27,300 Glider keys in use. This represents less than 0.3% of the 9.3 million WoW customer base. It is difficult to understand how such a small number of users could have a significant impact on the game. To put this in perspective, the defendants' expert report argues that Glider imposes damages of at least \$20 million (Castronova report, p 28). This represents about 4% of Blizzard's total profits for 2007. It is implausible that the very small number of Glider users could have had such a significant impact.

The evidence presented in this section suggests that WoW and Blizzard are both quite successful. The game continues to attract paying subscribers in far higher numbers

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than any other competing virtual game. A priori there is little reason to think that there is a factor which is specific to WoW that is alienating customers. The defendants are making just such a claim about Glider. Therefore it is incumbent on the defendants to provide clear and compelling evidence of the harm from Glider. As I will argue in the next section, such evidence is never provided.

### **III. The Defendants Provide No Empirical Evidence of Harm**

A wide range of harms, such as those stemming from gold farming or bots, are discussed in the Castronova report (Sections II-VI). What is absent is empirical support for these claims. By this, I mean data which helps show that the stated effect is important in WoW. The report presents no data showing Glider itself is the source of any damages. The only numbers regarding harm listed in the entire report-- the 300,000 complaints about bots -- are rather tangential: the complaints could be due to bots other than Glider, as discussed in a later section, and it is quitting the game, rather than complaints, which are the source of damages.<sup>4</sup> It is not even known whether bots were actually the reason for the complaint.<sup>5</sup> Every other number presented in the defendants' report is simply assumed or derived from an assumed value

Why is this important? Empirical evidence is the cornerstone of any analysis of economic damages. Theory only suggests that some factor may be at play. It never tells us that it is widespread, nor does it tell us whether it has important effects. It is only possible to establish significance through some kind of data analysis. This point carries particular weight in this case since, as I will show in a section below, there are several countervailing arguments which suggest Glider has beneficial effects. If the effects I have outlined are more important, then there are no damages at all. It is simply not possible to

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<sup>4</sup>More information is also needed before the significance of the 300,000 complaints is possible. If there are millions of complaints in total, then this is not likely to be an important factor in players' decisions about whether to continue to remain subscribers.

<sup>5</sup>Regular human players are often reported as bots because they are doing repetitive tasks, whether they are "Chinese gold farmers" or simply regular players



establish a specific dollar value for the real-world damages in the absence of some data analysis. I will return to this point in my discussion of the defendants' damages model.

The use of empirical arguments is common practice whenever economic damages are calculated. This is the standard used in academic work. I am not aware of a single published economics paper which tries to establish numerical economic damages in the absence of any empirical data. This is also the standard which is increasingly being applied to judicial decisions. For example, the Federal Judicial Center's publication *Reference Manual on Scientific Evidence* argues that whenever possible economic damages calculations should be based on a scientific analysis of data.<sup>6</sup>

There is little reason the defendants could not have performed even a rudimentary empirical analysis. For example, one of the defendants' key claims is that Glider leads players to quit WoW. To see assess the importance of this, the defendants' could have surveyed current and former players and ask whether Glider was an important element in their decision to continue or to stop playing. These data could be analyzed using well-established techniques such as a regression to specifically calculate what proportion of players exit WoW due to Glider. Such a calculation was never performed. Not only did the defendants' expert fail to collect the relevant data (which is hardly difficult to do since these are Blizzard's clients), he simply assumes a specific numerical value for the Glider-induced quit rate (Section VII, p22).<sup>7</sup> Similarly, in establishing the costs which Glider imposes on Blizzard (Section V) the defendants should have presented a simple calculation based on readily available data from the firm. He could have determined the number of hours workers spend policing WoW for Glider, and then multiplied this by their wage rate to establish a monetary cost value. No such calculation was done.

This omission is even more glaring, since other virtual gaming companies make related calculations all of the time. For example while the defendants' report describes inflation (Section III), no evidence is presented about whether this is a significant issue in

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<sup>6</sup>The second edition of this book, published in 2000, is available at, [http://www.fjc.gov/public/home.nsf/autoframe?openform&url\\_1=/public/home.nsf/inavgeneral?openpage&url\\_r=/public/home.nsf/pages/610](http://www.fjc.gov/public/home.nsf/autoframe?openform&url_1=/public/home.nsf/inavgeneral?openpage&url_r=/public/home.nsf/pages/610) (last accessed 5 January 2008).

<sup>7</sup>These data are distinct from the one set of numbers provided in the defendants' report, the number of complaints due to bots. This does not tell us how many players actually quit the game, and it never differentiates between Glider and other bots.

WoW. In contrast other MMORPG companies employ PhD economists to study their virtual economies. For example, Eve Online currently has a full-time PhD economist on-staff who empirically studies their on-line economy. Other companies, such as Second Life, present detailed inflation statistics on their webpage. Using this information Second Life has also been able to avoid inflation problems.<sup>8</sup>

Given the central role these claims play in the damages calculation, I was interested in performing such an analysis myself. Several pieces of data were requested from the defendants. Unfortunately, the provided information was insufficient for this purpose:<sup>9</sup>

- a request was made for surveys of users who cancelled their WoW account. While Blizzard keeps such records, the surveys do not have consistent and reliable information regarding the reason for the cancellation.
- request was made for the total number of WoW complaints and their categories in the period since Glider was released. Blizzard does not keep separate totals of complaints relative to other customer contacts, nor does it track any category of complaints dealing with bots or Glider more specifically
- a request was made for the number of WoW account bans due to different kinds of bots. Blizzard does not keep records of the bot developer when it bans an account.
- a request was made for details of Blizzard's cost increases associated with Glider. While data was provided on the number of workers who may deal with Glider-related issues, there was only very coarse information on how much of these workers' time was specifically devoted to Glider.

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<sup>8</sup>Eve Online's use of economists is described in "In an Ever-Changing Galaxy, the Action's Starting to Get Intriguing," The New York Times, 28 November 2007 (available at <http://www.nytimes.com/2007/11/28/arts/television/28eve.html>). Many reports from the Eve economist are available at+ <http://myeve.eve-online.com/devblog.asp?a=author&p=CCP%20Dr.EyjoG> (last accessed 5 January 2008). The data from Second Life are available at <http://secondlife.com/whatis/economy.php> (last accessed 6 January 2008). The creator of Second Life discusses how exchange rates are stabilized using automated circuit-breakers in this interview, <http://freakonomics.blogs.nytimes.com/2007/12/13/philip-rosedale-answers-your-second-life-questions/> (last accessed 6 January 2008).

<sup>9</sup>The list is based on an email from the defense counsel dated 8 January 2008.

- a request was made for the costs associated with enforcing WoW's EULA/TOS. Blizzard does not keep track of such information.

Given these limits, I instead analyzed data collected from public sources. If the defendants' provide more detailed data at a later date, a supplement to my report will be filed.

Note that the absence of such data in and of itself casts doubt on many of the claims in the defendants report. For example, if Blizzard itself does not have records of why users quit, how could they ever know whether Glider was a leading factor?

In conclusion, the Castronova report does not satisfy even the most rudimentary burden of proof. Since the defendants' expert makes specific claims about economic damages, he is obligated to provide evidence that the effects are important in the real world. He has not done so.

#### **IV. Glider May Benefit Blizzard**

The defendants' expert report suggests channels by which Glider may reduce the appeal of WoW and harm Blizzard. A detailed critique of these points is presented later sections. Before that, however, it should be noted that Glider may in fact benefit Blizzard by increasing the number of subscribers and by increasing the playing time of current subscribers.

Many Glider users may not have subscribed at all to WoW if Glider was not available. One of the main appeals of Glider is that it allows players to spend less time in the relatively unexciting tasks associated with the lower levels of WoW, and more rapidly embark on the challenges at higher levels (many of the most exciting stages of WoW are only available at the highest levels).<sup>10</sup> Glider increases WoW's appeal, since it allows

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<sup>10</sup>Some examples of exciting game features which are only available at higher levels include PVP arenas, heroic dungeons, flying mounts (Level 70 required). In addition, most of "The Burning Crusade" expansion (released in January 2007) requires Level 58. Also, every new 25-man raid dungeon introduced since The Burning Crusade is accessible solely to level 70 players (see <http://www.wowhead.com/?zones=3#0-2+1>, last accessed 8 January 2008). Almost half of the 5-man dungeons require level 70 as well (see <http://www.wowhead.com/?zones=2#0-2+1>, last accessed 8 January 2008).

players to more effectively spend their time on enjoyable tasks. Now imagine that Glider had never been created. Many of its current users would have decided never to play WoW at all, since they would face many hours of drudgery before getting to the enjoyable higher levels. According to one survey, it takes 20 days of continuous play, or 3 full work months to go from level 1 to 60.<sup>11</sup> Many potential players simply do not have that time available, and would not play WoW if this was the commitment to get to the desirable stages.

In fact we know that Glider users must value this time-saving, since they pay a fee to use the Glider program. That is, if playing the lower-levels was not a burden they would simply not have purchased the Glider program. Glider is providing a service which enhances the value of WoW to its users, who very well may never have played if Glider was unavailable. This suggests that Glider increases the WoW subscription base.

There are other ways in which Glider may benefit Blizzard. One channel is through the creation of multiple user accounts. Many existing users wish to try a new character class, but do not have the time to grind the new character up to the level cap by hand. Glider allows these users to more quickly level their second character (called an "alt"), and so promotes the creation of multiple user accounts. Another reason Glider leads to multiple accounts is the possibility of banning. Many Glider users maintain more than one account to ensure that they will be able to continuously play WoW, even if one of their accounts is banned. In fact several users on the Glider forum describe having multiple accounts.<sup>12</sup> These redundant accounts should have a positive effect on Blizzard revenues (since a Glider player pays for multiple WOW account codes as well as multiple subscriptions) but virtually no effect on costs (since only one account at a time is actually used). This would increase Blizzard's profits.

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<sup>11</sup>These numbers come from [http://blogs.parc.com/playon/archives/2007/03/accumulated\\_lev.html](http://blogs.parc.com/playon/archives/2007/03/accumulated_lev.html) and <http://www.nickyee.com/daedalus/archives/001370.php>, both of which were last accessed 16 December 2007.

<sup>12</sup>See the discussion at <http://www.ludogrind.com/mdy.html>, last accessed 2 January 2008. Note that even if the user does not open another account until after he is banned, most of the positive effects for Blizzard remain.

## V. The Defendants' Report Conflates Glider with Other Activities

The Castronova report discusses the harm to WoW from a wide variety of activities, such as gold-farming and the use of bots. The damages described in the Castronova report are for these activities taken as a whole. But Glider is at most a minor contributor to gold farming and but one of many bots. To attribute all harm from these activities to Glider is akin to saying that a single car manufacturer is responsible for all automobile pollution. In the same way, MDY should not be liable for any harm due to other parties.

There is an even more serious flaw with the defendants' report. There is no evidence showing that Glider itself is the source of the listed damages. As I describe below, it is other bots and non-Glider assisted gold farming which is likely the root of these problems. Attributing these problems entirely on Glider is, returning to the automotive analogy, like blaming all pollution on a small producer of hybrid cars. Glider is more innocuous than other bots, and it is likely to be only a minor contributor to the listed harmful activities. The damages from Glider could be at most a fraction of those claimed in the Castronova report.

To see this, let us begin by considering what gold farming is. Gold farming involves a repetitive action in the game with goal of accumulating currency (gold) as well as other items. Oftentimes, the gold is sold (for actual currency) to other players outside of the game, which is often referred to as Real-Money Trading (RMT). The Castronova report states in several places (e.g. Sections III and IV) that Glider is a leading contributor to such gold farming. There is, however, absolutely no evidence to support this claim. Two recent reports, an article in *The New York Times* and a story on NPR, present a detailed look at gold-farming.<sup>13</sup> Much of gold-farming is done by the roughly 100,000 workers in China. These workers manually play WoW for several hours every day, oftentimes in alternating twelve-hour shifts, engaging in repetitive actions within the

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<sup>13</sup>Julian Dibbell, "The Life of the Chinese Gold Farmer," *The New York Times*, 17 June 2007 (available online at <http://www.nytimes.com/2007/06/17/magazine/17lootfarmers-t.html>) and Louisa Lim, "China's 'Gold Farmers' Play a Grim Game," *NPR*, 14 May 2007 (available online at <http://www.npr.org/templates/story/story.php?storyId=10165824>).

game with the goal of accumulating gold and other goods (their employers then sell this gold to other players via RMT). There is no evidence that these workers use supplemental programs such as bots, and in particular no evidence that Glider is ever used in this activity (neither *The New York Times* story nor the NPR report mention bots or Glider, though both specifically described WoW). Humans are preferred over bots since this avoids bans from software detection, and also because humans are faster at killing than bots (or at least Glider).<sup>14</sup> Any harm which gold farming may impose is primarily the result of these workers, not Glider. Even if bots are deployed in gold farming, Glider is unlikely to be the bot which is used. As I discuss next, this is because Glider's design makes it a relatively unattractive to gold farmers.

Next, let us turn to bots. These are bits of software which automate play in MMORPGs. Glider is but one of many bot programs which are in use on WoW. The Castronova report states in several places (e.g. Sections II-VIII that bots significantly harm Blizzard). However, there is never any distinction drawn between bots and Glider. While it is difficult to get a full census of bots, a simple Google search reveals over one hundred alternatives.<sup>15</sup> This does not even count the many related activities or software which allow players to exploit the WoW game to quickly level or accumulate gold.<sup>16</sup>

Many of these alternative bots are specifically designed to perform the tasks which the Castronova report claims lead to harm, such as gold farming. Glider is not designed for such tasks, but rather to allow a player to continue play when he cannot be at his computer (say to eat dinner or go to work). For example to successfully gold farm it would be useful to have a bot automate mailing, sell rare drops, repeat quests, and have centralized control over multiple bots, all tasks which are unsupported by Glider (the FAQ at [mmogliders.com](http://mmogliders.com) indicate Glider is neither designed nor marketed for gold farming). In contrast, InnerSpace (also known as ISX, ISXWarden, LavishSoft) created a set of tools which allows other developers to design custom bots for WoW. Organizations

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<sup>14</sup>Another reason humans are used is that the wage rate paid to Chinese workers is relatively low, so using a bot such as Glider would not reduce costs.

<sup>15</sup>This is based on the search terms "World of Warcraft bots" and then eliminating false matches (search performed at <http://www.google.com> on 4 January 2008).

<sup>16</sup>Examples of these are "dupes," "cheats," or "exploits." There are over one hundred examples of this listed on <http://www.wowzor.com/> and its sub-pages, site last accessed 4 January 2008).

such as GamePal created a bot specifically designed for gold farming using the InnerSpace tool. Another option to aid in gold farming is private bots. In this case the software is never publicly released and so Warden (Blizzard's detection tool) rarely detects it. A gold farmer will run multiple versions (100 or more) of this bot simultaneously and can design them to behave in an aggressive fashion because they are unlikely to be detected. Such private bot farms are thus likely to be the root of much of the damages which is mentioned in the defendants' report. In short, there are a wide range of bots which are better suited to gold farming than Glider. The defendants' report provides no evidence that Glider in particular is used for gold farming.

The general point is that even if bots damage WoW or Blizzard, this is not the same thing as Glider causing damage. Several bots besides Glider contribute to the harmful activities listed in the defendants' report, and some are specifically tailored to do these particular acts. Glider can only be responsible for a small fraction of any damages attributed to bots which are described in the defendants' report.

## **VI. Evidence of Damage (Part I): Direct Harm**

The Castronova report makes several theoretical arguments that Glider damages WoW and Blizzard (Sections II-VI). In the last section I noted that these arguments are in fact about a wide range of activities and software of which Glider is only a minor contributor. In the next two sections I consider the specific arguments in turn. I will show that many of these arguments are incorrect. Just as importantly, there is no empirical evidence supporting any of these claims. I will provide specific evidence that Glider is not likely to cause the harms listed in the Castronova report.

This section discusses the direct harms listed in the defendants' report. These are damages due to WoW users directly interacting with Glider. For example, the report claims "Glider bots are frequently encountered by normal players who consider the bots a nuisance" (p14, see also the discussion on p16-17, p24-25) and that a Glider user will play WoW for a shorter period than he otherwise would have (p20-21, see also p4-5).

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There are serious flaws with these claims. I will begin with the contention that WoW users have frequent and upsetting interactions with Glider. It is implausible that many WoW players encounter a Glider bot, since Glider represents less than half a percent of the WoW population. These numbers overstate the likelihood a player will encounter WoW, since Glider is not designed to operate on one of the two kinds of WoW servers. Glider cannot be used to fight other players, so it is not likely to be used on “PvP” servers in which players of opposite faction (Horde or Alliance) can attack each other in the wild.<sup>17</sup> Glider is designed for use “Normal” servers in which players cannot attack one another. Encounters with other players are less likely to be memorable on these servers, and so less likely to trigger complaints. And when a player encounters a Glider user, it is not always true that he will know it is a bot. The defendants argue this is clear because the bot cannot communicate well (p16). But users rarely converse when they encounter one another. In addition, non-communication may reflect language difficulty rather than a bot (users from around the world populate WoW). A player who encounters a non-conversing player may very well presume that player does not use English as his native language. There is little reason why this should be upsetting..

Given these data and reasoning, one would expect the defendants’ report to offer detailed evidence of the harm of direct Glider encounters. But no empirical support is offered. There is no information provided about the frequency in which WoW users encounter Glider, nor is there specific evidence that players consider such interactions to be a nuisance. The only support given is that there are complaints about bots, but, as I discussed in an earlier section, there are many other bots and these complaints need not be about Glider.

The second direct harm in the defendants’ report is a claim that Glider users spend less time on WoW and so reduce Blizzard’s subscription revenues. The argument is that Glider allows players to more rapidly reach higher levels in WoW, and the reduction in revenues is the time savings times the subscription rate (p20-21).

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<sup>17</sup>While Glider can run on a PVP server, it is likely to be killed. This is because Glider will not fight other players if they attack it. This means players of the opposing faction can simply kill a Glider player with little risk to themselves.



There are several problems with this argument. First, it assumes the goal of players is simply to reach the top level at which point they quit. It is highly unlikely that a Glider user would behave in this way. This would mean the player purchases Glider, allows it to play WoW for him while he is away, and then he stops playing WoW. It makes no sense why someone would choose to this. Glider is only useful if the player wants to continue playing WoW. There are several reasons for this: as I described earlier, the more challenging and interesting tasks occur at the higher levels and most of the new content being introduced in WoW is at level 70. While the upper levels hold great appeal, the lower ones can be monotonous and boring. As I argued in an earlier section, Glider users may in fact have never become WoW subscribers at all if Glider had not been created.<sup>18</sup>

A second problem with the defendants' argument is the unrealistic manner in which it presumes Glider is used. The defendants' calculation presumes that Glider is deployed around the clock for twenty days straight (p21). But there is no evidence that Glider is actually used this intensely. Glider requires occasional monitoring, since the player has to physically move Glider to the next zone once he over-levels his current spot. So unless the player is also awake twenty-four hours a day, around the clock use is not realistic. Glider is more likely to be used for shorter periods (such as when the user is sleeping). If Glider use is intermittent, the defendants' calculation significantly overstates the time savings and potential revenue loss. Given these arguments, it is again necessary for the defendants to provide some evidence about the actual reason Glider users quit. None is provided in their expert report.

It is also worth noting that Blizzard itself has instituted changes which effectively mimic the time savings due to Glider. In the most recent WoW patch, Blizzard changed the leveling requirements from 10 through 58 to require 15 to 45% *less* experience to

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<sup>18</sup>These arguments can be restated in slightly more formal terms. A user's subscription period has two distinct parts: the first part (which I will label as "x") would be leveling from 1 to the level cap, and a second part which is the time spent at the level cap (which I will call "y"). The defendants' claim is that Glider shortens "x." But what is relevant is the total subscription time, "x+y." Without Glider, this total would be zero for some users (since they would not subscribe in the first place).

level.<sup>19</sup> It is as if all players are now using Glider. If the defendants' time-saving argument were correct, this means Blizzard itself is helping reduce its subscription cost. Since no game-maker would ever knowingly hurt itself, this is prima facie evidence that Glider's leveling function cannot be a source of damage.

## **VII. Evidence of Damage (Part II): Indirect Harm**

The defendants' report argues that a most of the damages from Glider arise from indirect effects (p5-6). The claim is that Glider deteriorates the WoW environment, and can lead players to end their subscription (or discourage new players from signing-up) even if they are not sure of its ultimate source. The particular environmental variables which are cited as being damaged are the WoW economy, the effective subscription costs, the quality of play, and the sense of inter-player fairness. I will discuss each of these variables in turn.

Before turning to the specific points, it is worth noting two general points. First, the defendants' report provides no empirical evidence to support the claim that Glider is a significant contributor to the stated problems. In fact most of the arguments are not specific to Glider but rather are general claims about bots, of which Glider is but one of many. In my discussion below I will use data whenever possible and also distinguish between Glider and other bots.

Second, the defendants' report occasionally states the problems are significant enough to damage the game's reputation enough to dissuade new players from becoming

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<sup>19</sup>The increased in leveling speed depends on how many quests the player completes. The direct increase in leveling speed is 15% (see the discussion of "Leveling Improvements" in patch 2.3, <http://www.worldofwarcraft.com/patchnotes/>, last accessed 8 January 2008, as well as this posting from a Blizzard representative, <http://forums.worldofwarcraft.com/thread.html?topicId=2215496403&sid=1>, last accessed 8 January 2008). Blizzard also increased the experience value for completing quests an unspecified amount. Using actual quests, the latter change increases experience between 35 and 45% (there is a 45% increase at <http://www.wowhead.com/?quest=3565>; a 38% increase at <http://www.wowhead.com/?quest=2258>; a 44% increase at <http://www.wowhead.com/?quest=7861>; all pages last documented 8 January 2008). So the net effect is that leveling from 20 to 60 is shortened by between 15% and 50% (the increase in quest experience is extra powerful because they provide more experience against a lower cap).

WoW subscribers (p27). Even if these problems actually occur, it is unlikely many potential players will know about them. Many of the newer WoW players are novices who know little about such games. They are attracted to WoW precisely because it is relatively easy to quickly master simple tasks, something not possible with the previous generation of more complicated MMORPG such as EverQuest.<sup>20</sup> Much of Blizzard's economic success derives from such new users, and the relatively limited impacts Glider might have on WoW are unlikely to change their decision to join.

#### **A. Damages to the Economy (Inflation)**

The defendants' report claims in Section III that Glider destabilizes the WoW economy because it leads to an influx of gold (the WoW currency). The idea is that Glider allows a user to accumulate gold at a more rapid rate than other players. As a result gold is more common, the price of all goods will increase, and inflation results. Since other users continue to collect gold at the same rate (through activities such as killing monsters), they see a reduction in purchasing power. This discourages players and leads them to either quit or to engage in activities which hurt the game's reputation (p11).

This assertion is simply incorrect.<sup>21</sup> I first show, using hard data, that Glider is not a source of inflation. I then argue that even if Glider allows for more rapid gold accumulation, this need not lead to inflation. Finally, I argue that inflation need not hurt players.

To begin I show that Glider is not a significant contributor to inflation. If it were, then removing Glider from WoW should lead inflation to subside. Just such a Glider-free period occurred during the end of 2006. Blizzard effectively banned all Glider users over the period 16 November 2006 through 12 December 2006.<sup>22</sup> This period provides a direct

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<sup>20</sup>See <http://www.nytimes.com/2005/02/10/technology/circuits/10warr.html> and <http://www.nytimes.com/2005/09/06/arts/design/06worl.html?pagewanted=2> (both last accessed on 18 December 2007).

<sup>21</sup>The defendants never provide any evidence (or even anecdotes) that inflation is a significant problem in WoW or that it leads players to quit the game.

<sup>22</sup>On 16 November 2006, Blizzard banned all accounts which had used Glider for the previous twenty days. (<http://vforums.mmoglider.com/showthread.php?t=40229>, last accessed 8 January 2008). MDY disabled Glider and halted sales for the next week. Over the next few weeks, MDY stated the Glider was "unsafe"

test of the Glider-inflation link. If inflation did not markedly change during the ban period, this means Glider is not a significant inflation source.

The figure below shows daily WOW price data (the price per unit of gold in U.S. dollars, averaged over several real money trading sites).<sup>23</sup> For most of 2006, the price of gold went up. This means it took more dollars to buy a unit of gold, which means that players are placing a higher value on gold. This is the opposite of what should happen if inflation were significant, in which case a given piece of gold buys fewer virtual goods and is less valuable. Given that the number of Glider users was growing over this period, this is independent evidence against the Glider-inflation link.

The more direct test of the Glider-inflation link is the blue shaded region, the period during which Glider was banned. There was no noticeable change in the gold exchange rate during this period. This is direct evidence that Glider is not a significant source of WoW inflation.<sup>24</sup> Intuitively this is plausible since: (i) there are relatively few Glider users; (ii) as discussed in an earlier section, Glider is not specifically designed to accumulate gold.

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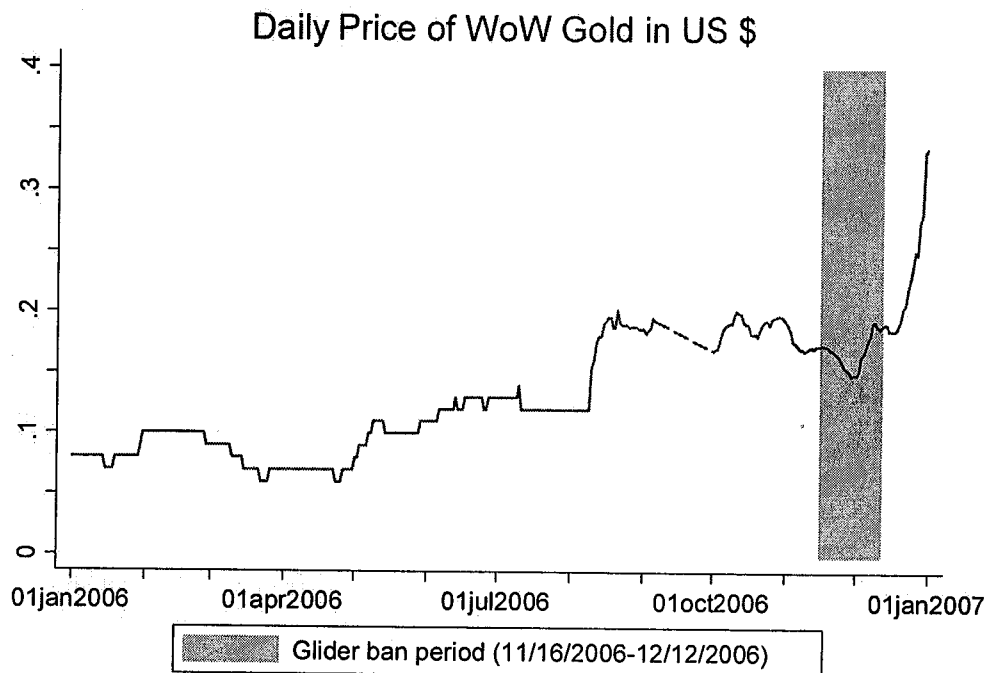
and did not recommend use (<http://vforums.mmoglider.com/showthread.php?t=42447>, last accessed 8 January 2008). It was not until the release of a Glider update on 12 December that Glider usage began to return to normal (<http://vforums.mmoglider.com/showthread.php?t=43463>, last accessed 8 January 2008).

<sup>23</sup>The data are available as the download file "Historic World of Warcraft Prices," available at [http://www.swivel.com/data\\_sets/show/1002764](http://www.swivel.com/data_sets/show/1002764) (last accessed 27 December 2007). These data are generated in the following way: prices are queried from a large number of gold sellers each day (an average of 8500 quotes per day are collected). The price is the average of these quotes. Note that there is generally very little dispersion across gold sellers. Details on the data collection were provided in a personal communication from Brandon Checketts (dated 28 December 2007), the webmaster at <http://www.gamepricewatcher.com/> and author of the price data.

<sup>24</sup>The large appreciation of WoW gold at the very end of 2006 was due to a rise in demand related to upcoming release of the expansion pack "The Burning Crusade" (sales began 16 January 2007). The increase did not begin until right around Christmas Day, and so cannot be attributed to the Glider ban.

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Expert Report by Koleman Strumpf



Note that even if Glider allows players to accumulate gold, it does not follow that inflation will result. Inflation comes about because the money supply (in this case gold) increases faster than demand for the underlying goods. But there are reasons to believe Glider increases the demand for goods. Glider users spend most of their time playing at the highest levels (as the defendants' report argues, little time is spent in the beginning levels). There is a huge demand for gold in the top levels, where there a wide variety of incredibly expensive items available for purchase. Blizzard itself sells three of the most expensive high-level items (epic mounts, normal flying mounts, and epic flying mounts). There is a fixed gold price for Blizzard's goods, and when they are purchased the gold is removed from the economy.<sup>25</sup> These purchases reduce the gold supply and help offset any gold which may have been accumulated during Glider use at lower levels. Similarly,

<sup>25</sup>For example, in 2006 WoW had a top level of 60, and a level 60 epic horse cost 1000g. In 2007 the top level was increased to level 70, and at this level the epic flying horse cost 5000g.

Glider users accumulate not just gold but also virtual goods such as armor, weapons, and potions. This deflates gold, since there are now more usable goods in the economy. If goods are accumulated at the same rate as the gold, then no inflation will result.

Finally, even if inflation were to occur it does not necessarily follow that this hurts players and leads them to exit the game. The defendants' claim is that inflation reduces the value of a player's time, since he continues to collect gold at the same rate and yet prices of goods go up. That is, the purchasing power of a unit of gold is diminished. But this ignores the fact that a player is just as likely to be a seller, in which case he benefits from inflation. During the course of their activities (such as killing monsters, mining, or gathering herbs), players collect not just gold, but also items. When the player sells these items, he can fetch a higher price if there is inflation. He can use the additional gold he makes from selling, to purchase other goods which have also appreciated in price. So long as inflation impacts all goods equally, it should have little impact on most players. They will still be able to obtain the same amount of goods from any given time spent on an activity like fighting.

#### **B. Increases in Effective Subscription Costs (Real Money Trade of Gold)**

Section IV of the defendants' report argues that players may also turn to gold purchases outside of WoW in order to keep up with inflation (such purchases are referred to as Real Money Trade or RMT).. The defendants argue Glider plays two roles here, as the source of both the inflation and also the external gold. The gold purchases cost real money, and so increase the effective price of playing WoW and decrease the number of subscribers. While Blizzard does not benefit from the RMT sales, it suffers from the reduction in the subscriber base.

There are several flaws in this argument. First, it is predicated on Glider causing inflation and on inflation increasing demand for gold. The empirical evidence in the last sub-section showed Glider has little impact on inflation. And since players are sellers as well as buyers, I presented arguments which showed that inflation need not increase demand for gold. Also note that much of the recent increased demand for gold comes

from Blizzard itself, which has introduced increasingly expensive items in the highest levels (see the last sub-section). Such demand will not lead to RMT, since Blizzard does not participate in that market. Second, there is no evidence that Glider is the source of RMT gold. I showed in the previous section that Glider is unlikely to be used for this purpose. Third, the defendants' report likely overstates the actual cost of any RMT gold purchase. While the report presents no evidence about the amount or frequency of gold purchases, it argues that a player will typically spend \$15 a month to buy gold (p12). The justification for this value is this is the price of the smallest increment of gold which is typically sold (300 units). But why must a player use up all of this gold in a month? This may last him multiple months, in which case the increase in effective costs is only a fraction of what is claimed. Finally, it is worth stressing that there is no evidence given to support the assertion that players actually end their subscriptions because of RMT-induced costs. This is troublesome, since players that quit are the root source of Blizzard's assumed damages from RMT.

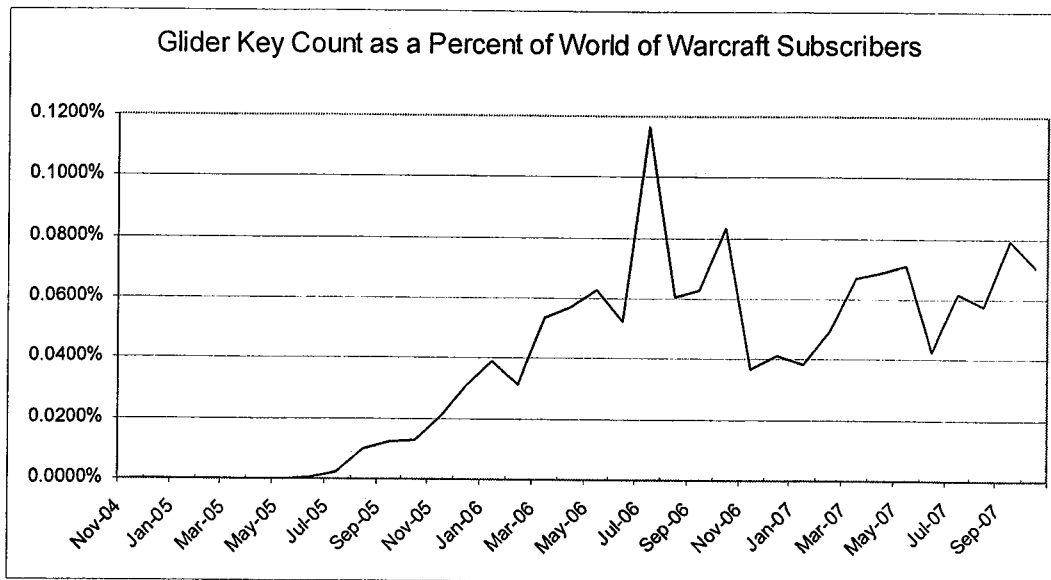
### **C. Diminished Quality of Play**

Section VI of the defendants' report also argues that Glider reduces the quality of play by destroying the fantasy of being in a totally virtual world. The claim is that as Glider becomes more common, all players will inevitably be forced to themselves use bots. Inevitably, only bots will remain in the game.

This argument does not hold up to close scrutiny. To begin with, it is inconsistent with empirical data on Glider usage. The claim is that Glider use should accelerate, with a larger and larger percentage of users employing the bot. The figure below shows the monthly number of Glider keys sold as a percentage of all WoW subscribers. After the initial introduction period, there is no evidence that Glider use is accelerating.<sup>26</sup>

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<sup>26</sup>Related data on Glider's gross revenues by quarter were turned over during discovery.



In terms of theory, no clear reason is given why players should utilize Glider or why this decision should depend on how many other players are using Glider. The main purpose of Glider is to speed transition to the highest levels. It is unclear why Glider would become more appealing if many other players use it. Presumably, this has something to do with the other harms which the defendants associated with Glider. The above sections show there is little evidence of such a connection.

The defendants' report claims it is theoretically inevitable that widespread botting will occur.<sup>27</sup> The theoretical touchstone is the "N-Person Prisoner Dilemma" in which individuals behaving in a self-interested fashion (whether to bot or not) ends in collective ruin (everyone adopts a bot and the game is ruined). The defendants' report argues such an outcome is inevitable in such problems (p18-19). This claim is simply false. While several citations are listed, they involve the relatively simple case in which decisions are only made once. WoW is inherently a dynamic environment in which players repeatedly interact with one another in quests and other activities. It is well known that such dynamic prisoner dilemmas can result in a collectively favorable outcome. The intuition is that if a player takes an action which hurts others (in this case

<sup>27</sup>The defendants' report again conflates Glider with other bots in the discussion in this section.



adopt a bot), then the others agree to forever more punish him. In terms of the game at hand, players could shun a bot user (say by excluding him from a guild) or bar him from their group (including group activities such as a special quest, dungeon, or PvP). As a result, the incentive to use a bot are limited and widespread use is not inevitable.<sup>28</sup>

And again it is worth stepping back to examine the defendants' claim in a broader context. The report claims there has been an "ongoing destruction of WoW" (p19) due to this phenomena. This hardly seems consistent with the continual and unprecedented growth in the WoW subscriber base. Glider has been available for two and a half years, almost as long as WoW itself. Yet Glider remains a small part of the game, and is hardly growing out of control. The predicted "World of Botcraft" (p20) will not be occurring any time soon.

#### **D. Reduced Fairness**

The final way in which Glider is argued to impact players is through a reduced sense of fairness. The defendants' report states that players gets discouraged because they see others (Glider users) doing far better than them in accumulating resources and reaching higher levels. Even if he does not know that Glider is the source of the others advantage, this will lead him to "quit the game and encourage others not to purchase it" (p5).

This is unlikely to be a significant problem with Glider. The point is predicated on players observing the Glider users favorable experiences. But there are very few Glider users, less than half a percent of the WoW subscriber base. Moreover, as the defendants' report itself argues, players are unlikely to communicate with a Glider user (p16). This raises the question: how exactly do other users know about the Glider player's success?

In addition, even if players knew that others were having more success in the game than they are, it is unclear why they should care. The appealing elements of the

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<sup>28</sup>Dynamic prisoner dilemmas are discussed in virtually any game theory text. See for example the discussion of supergames in, Drew Fudenberg and Jean Tirole (1991). *Game Theory*. MIT Press.

game – the adventures and interactions with fellow guild members, the new challenges upon reaching higher levels—remain even if some choose to use bots.

At any rate, there are no damages to Blizzard unless there is an impact on subscription rates. The defendants' report offers no evidence that equity issues influence quit or sign-up rates. There is little reason to believe this is a significant effect.

### **VIII. Impact on Blizzard's Costs**

The final source of damage is listed in Section V of the Castronova report and involves Blizzard's costs. The report claims that Blizzard must divert resources to investigate and address customer complaints about Glider, and they must also spend money to detect and ban Glider users (Section V).

The first claim is that Blizzard must devote significant employee time to addressing players complaints about Glider. There are several reasons to be doubtful of this claim. First, there is no evidence whatsoever which establishes that Blizzard spends significant resources to specifically address Glider complaints. The only information provided at all is that Blizzard has received thousands of complaints about bots. But how many of them were about Glider? Given the large number of alternatives and the relatively benign design of Glider described in earlier sections, likely only a small proportion of these complaints are about Glider. And how many total complaints does Blizzard typically receive? The report notes that Blizzard has received "millions of additional complaints" (p15). If all complaints must be dealt with, the botting complaints impose a relatively small burden.<sup>29</sup>

Even using conservative accounting, these costs are likely to be small. While the set of bot complaints likely spans an extended period of time, say the number represents the typical number of complaints in a given year. If it costs \$1 to handle each botting

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<sup>29</sup>The defendants' report also suggests that the additional complaints for issues such as inflation and gold-farming could be attributed to Glider. The last section showed there is at best a tenuous connection between Glider and these activities.

complaint, this adds \$300,000 to Blizzard's costs. This is rounding error for a company with over \$1 billion in annual revenues.

As I mentioned in an earlier section, it is quite surprising that no specific evidence is provided on customer service costs. The company clearly has access to its own employment records and could have shown the proportion of employee costs associated with combating Glider. Such very basic information is never presented.

The second cost is associated with trying to keep Glider out of WoW. This is a red-herring. If Blizzard decided instead to permit the use of Glider, it could avoid all of these costs. The fact that they choose to spend money policing for Glider users is not damage at all, but just a reflection of a choice the firm has made. This aside, it is worth noting that such enforcement costs are never quantified nor is there any evidence that these costs are significant.<sup>30</sup>

## **IX. The Defendants' Calculation of Economic Damages**

In this section I discuss the defendants' calculation that Glider imposes roughly \$20 million per year in economic damages (p21-23 and p28 of the Castronova report).<sup>31</sup> The first sub-section discusses how the underlying model is inappropriate for the case of Glider. The second sub-section takes the model on face-value and shows that the damage calculation is significantly reduced when more reasonable measures of behavior are used. In total, the analysis here suggests that the defendants' damages calculation is based on inappropriate assumptions and is likely to vastly overstate any possible harm from Glider.

Before turning to the specific analysis, note that the underlying presumption of the damages model is that Glider hurts the other WoW users and raises Blizzard's costs of operation (p22). If this is not true, then there are no damages at all. I have shown in the

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<sup>30</sup>The defendants' report says that there is "an entire team of programmers and investigators" working to keep bots out of the game (p15-16). But how large is this team? If there are only a few members, this is not significant for a large company like Blizzard. There is also not mention of how much time this team devotes to Glider as opposed to other bots.

<sup>31</sup>The defendants' report claims this calculation is an understatement of damages, since it only reflects the damages due to gold-farming (p23). I argued earlier that there is no evidence of any additional channels of harm.

previous sections that there is no evidence that Glider is a significant contributor to any of the listed harms. So even without a detailed analysis, there is little evidence of damages.

#### **A. The Model is Inappropriate to this Case**

The model underlying the damages calculation is presented in a companion paper.<sup>32</sup> This model was developed to address the harm caused by Real Money Trade (RMT) of gold. It has virtually nothing to do with bots. The 38 page companion paper mentions the words bot or robot only once, and this is to describe a very specialized “ad-spamming” bot which is quite different from Glider. The paper never mentions Glider at all. Given that there is no evidence that Glider is a contributor to RMT, it is unclear how this model is at all germane to the case.

Even ignoring this point, the model in the companion paper should not be used to calculate Glider damages. The model’s basic presumption is that there is a harmful activity which has become so large as to significantly change the game. All damages come about when the activity is widespread, and there are no damages at low levels of activity (p14 and p19 of the companion paper). But Glider is very small, representing less than one-half of one percent of the WoW user-base (in contrast, footnote 4 of the companion paper argues that a fifth of all players engage in RMT, the activity the model is designed for). It is clearly not pervasive as the model presumes. I will return to the issue of scope in the next sub-section.

There are other reasons why the model does not apply to this case. The model calculation presumes that all of the harmful activity is removed (p28-29 of the companion paper). But even if Glider were removed, there would still be many other bots and at least 100,000 Chinese gold farmers causing the harms described in the paper. The model calculates the magnitude of all harmful activity in the game, very little of which could be

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<sup>32</sup>Edward Castranova (2006). “A Cost-Benefit Analysis of Real-Money Trade in the Products of Synthetic Economies,” *Info*. Available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=917124](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=917124) (last accessed 17 December 2007).

due to Glider.<sup>33</sup> A second problem is that the model presumes this is a competitive market (one in which there are many gaming firms and consumers). But this case only involves a single firm, Blizzard. The welfare effects and the resulting damages may be quite different in a non-competitive market.<sup>34</sup>

Finally, the damages in the model come about because the activity leads to a reduction in the number of subscribers (p27 of the companion paper). But this is the opposite of what is happening in WoW, which is growing quite rapidly both in absolute terms and in relationship to its competitors. The model does not even broadly capture what is occurring in the WoW, and so should not be used as the basis of any damages calculation.

## **B. The Assumed Behavioral Parameters Are Too Large**

Putting aside the concerns about the model, the damages calculation is fundamentally flawed. The level of damages is essentially based on two behavioral responses: how Glider usage influences the demand for WoW and how it influences Blizzard's costs. The defendants assert that a one percent increase in Glider usage reduces demand and increases costs by 0.05% (p22 of the report or p27 of the companion paper). There is no justification whatsoever for these numbers. In the discussion below, I will argue that these "behavioral parameters" are likely to be far smaller and therefore that the true damage number is substantially smaller.

I will focus initially on the demand side. The question is how Glider influences quit-rates. Note this is quite different from the complaint rate, the only substantiated number in the defendants' report. Complaints have are likely to be far more common than quits. Players invest substantial time into their WoW characters, and so exiting is a significant and difficult decision. Registering a complaint is relatively costless, and does not require the individual to give anything up besides a few moments of his time.

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<sup>33</sup>The model also overstates total damages. for another reason. The calculation on p28 of the companion paper implicitly presumes that the current rate of damages would still apply even if there activity were reduced. However, the paper itself argues there will be no damages at low levels of activity.

<sup>34</sup>See the discussion of monopolies and monopolistic competition in Robert Pindyck and Daniel Rubinfeld, *Microeconomics*, 2004.

While the defendants do not provide any evidence of why players quit, an extensive set of surveys gives little support for the claim that bots (or Glider) is a significant factor. Nick Yee, who holds a PhD from Stanford and a member of the research staff at the Palo Alto Research Center, has conducted the largest survey to date of MMORPG players.<sup>35</sup> In a 2007 study of 2,896 players, Dr. Yee found that he could explain why players quit virtual using factors such as social motivation and a player's age (and in an earlier study, time limits and boredom).<sup>36</sup> Bots are not listed as a factor. In a personal communication dated 12 December 2007, Dr. Yee writes that he has never quantified the role of bots in quitting since "no one ever mentioned bots in the open-ended questions." He also wrote that "The only MMO I know of in which bots are [a] big problem is Ragnarok Online." Based on this empirical evidence the effect of Glider on quit rates is likely to be near zero.

There is additional quantitative evidence that Glider usage does not influence the number of WoW users. Recall that Glider was effectively removed from the game during the end of 2006. Yet during that period there was no acceleration in the number of WoW subscribers. To be specific, over all of 2006 the average increase in subscribers was 200,000 per month. Over November and December 2006 (roughly the ban period), the average increase was 175,000 per month. If Glider were a significant negative factor in the subscription decision, there should have been an upwards spike in subscribers during the ban period. No such spike occurred.

Such evidence aside, the Glider-induced quit rate which the defendants' assume is implausible. The claim is that a one percent increase in Glider usage (300 additional users) would lead to a 0.05% reduction in WoW demand (5000 fewer subscribers). That is, every Glider account leads over ten WoW users to quit! It is hard to understand how such a large effect is possible. Even taking a worst case perspective, there would be a one-for-one crowd-out (since Glider users are themselves subscribers, this means two

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<sup>35</sup>These surveys are part of Project Daedalus, which is explained in detail at <http://www.nickyee.com/daedalus/> (last accessed 5 January 2008).

<sup>36</sup>See <http://www.nickyee.com/daedalus/archives/001557.php> and <http://www.nickyee.com/daedalus/archives/000342.php> (both were last accessed 5 January 2008). Note that the latter study includes former as well as current players.

users would quit for every extra Glider in use). Using this as benchmark, a one percent increase in Glider usage would lead to 0.003% reduction in WoW demand.

Turning to costs, the defendants' report provides no concrete evidence that Glider increases Blizzard's costs (see the earlier discussion). The report's assumption that a one percent increase in Glider usage increases costs by 0.05% is implausible. A far more reasonable benchmark, though still likely a significant overstatement, is a 0.003% increase. This number is correct if the damages from Glider usage is proportional to the share of Glider users in the WoW population: a one percent increase in Glider usage boosts the share by  $300/9.3\text{million}$  or 0.003%.

These numbers can be used to create a more reasonable, though still worst case, measure of damages. Before doing this calculation, two more points are needed. First, I will follow the defendants' report and base my calculation on North American operations. There are roughly two million WoW users in North America.<sup>37</sup> Second, as noted earlier, the level of damages will be smaller when the number of Glider users is reduced. To operationalize this in a simple way, suppose that the damage rate is constant when there are at least ten thousand Glider users, and zero otherwise.

I can now replicate the defendants' calculation. The marginal damage from a one percent increase in the number of Glider users is an \$11,000 reduction in annual consumer and producer surplus. The total annual damages to Blizzard are then \$700,000.<sup>38</sup> Even this worst-case number is rounding error for Blizzard, which has over \$1 billion in annual revenues and \$500 million in annual profits.

In total, the defendants' model itself does not support the contention that Glider imposes significant damages. Even using very unfavorable behavioral parameters, the damages are less than a million dollars per year. But there is evidence that there is little

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<sup>37</sup>The calculation in the companion paper uses a base of five million users. The two million value comes from p23 of the defendants' report.

<sup>38</sup>To calculate the marginal damages I use the formula on p27 of the companion paper: multiply the number of subscribers (2 million) by the percent change in supply or demand ( $0.00003 * \$15/\text{month} * 12\text{months}/\text{year}$ ). To calculate total damages, I integrate the marginal damages over the base for which damages occur (when there are between 10,000 and 27,300 users) and multiply by 100 (reflecting the total elimination of Glider).

impact of Glider on the user-base or Blizzard costs. This is the most reasonable benchmark to use, and this would imply that there are no economic damages at all.

## **X. Within-Game Solutions to Harm**

The final point in the defendants' report deals with possible ways to deal with Glider. Section VIII argues that neither Blizzard nor WoW players will successfully be able to combat problems from Glider.

But if Glider does in fact cause harm, then it should be possible for WoW players to mitigate it. Social sanctions are a simple and effective tool which could be used. Such sanctions could be used to isolate a Glider user from trading opportunities, guilding, quests, and any of the other interactions with players which are so central to WoW. While the defendants' report states that the Glider program will not care about this (p24-25), its owner surely will. Being excluded from group activities is a significant penalty that would surely dissuade players from using Glider. The fact that such sanctions are not observed is additional evidence that Glider does not bother WoW users.

## **XI. Conclusion**

In this report I have analyzed the arguments in the Castronova report that Glider imposes significant damages on WoW and its owner Blizzard. There is no persuasive evidence of any damages. The report can be criticized on several grounds:

- It provides no empirical evidence substantiating any of the alleged harmful effects of Glider. There is no justification for why these effects should be significant, and the calculation of numerical damages is based on assumed parameters. This fails any kind of scientific basis: data analysis is the cornerstone of both academic and legal calculations of economic damages. In short, the defendants' report provides no hard data or even anecdotes which specifically link Glider to any of the alleged damages.



- It incorrectly attributes to Glider all damages from bots. Glider is but one of many bots, and I show in the report that Glider is not designed to assist in the harmful activities listed in the defendants' report. Glider could be responsible for at most a tiny fraction of the alleged damages.
- There are a variety of data which directly refute the claims that Glider damages Blizzard. For example, I show that inflation is unaffected when Glider is removed from the WoW game.
- The claim that Glider has created significant damages is inconsistent with WoW's dominant position in the virtual gaming world. Its subscriber base is eight times larger than its nearest competitor and it is growing far faster than any other game. This is hard to understand if Glider, which operates only in WoW, is deteriorating the gaming experience as the defendants' report claims. Blizzard itself is enjoying tremendous financial success and had profits of over half a billion dollars this year. This also inconsistent with the claim of significant financial damages.
- There are a variety of mechanisms by which Blizzard could benefit from Glider. For example, Glider could lead to an increase in the number of WoW subscribers.

The defendants' argue that MDY, which sells Glider, has imposed significant monetary damages on Blizzard. Yet there is no convincing evidence which supports this claim. In addition, my report lists many empirical and theoretical reasons which refute the defendants' claim. I am confident in concluding that Glider imposes little or no harm on Blizzard.

#### **AUTHOR'S SIGNATURE**

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Koleman Strumpf, PhD  
8 January 2008