

STS 145 Case Study
Sega: The effect of corporate conflict on game design

During the starting days of the Genesis [Sega co-chairman Hayao Nakayama] told 3rd party developers . . . not to defect from Nintendo, even though these companies wanted to develop for Sega. Ever since that time Sega Enterprises has formed strong alliances with the likes of Capcom, Konami, and various other companies, even more so than Nintendo at times. It just goes to show that Mr. Nakayama knew how to treat the third party publishers with respect [unlike Sega of America (SOA)] . . .

-Brian M. Briones, Sega-Saturn.com

Tom Kalinske [President of SOA] knew that the 16-bit business was going to be there. Paul Rioux knew it and so did Shinobu Toyoda, but Nakayama refused to believe . . . they would not listen to Tom. They would not listen to Paul. They would listen to no one and they absolutely bullied the U.S. into launching the [Saturn] . . . it very much compromised their ability to keep the 16-bit business.

-Steven Kent, "The First Quarter: A 25-Year History of Video Games"

The recent announcement of Sega'sⁱ abandonment of the Dreamcast sent shockwaves through the console gaming industry. Although the rumours and warning signs had been circulating for some timeⁱⁱ. Sega had been a significant player in the console market since the Sega Master System in 1986, and it was difficult for industry observers to believe that the company would abandon a console which at last count had total sales of five million in the USⁱⁱⁱ.

The decline of Sega's presence in the gaming market can be partially understood in terms of the company's business strategy, which promoted conflicting design and marketing paradigms amongst its international subsidiaries. As reflected in the two quotations above, critical opinion of Sega's business strategy has been extremely polemical, with American and Japanese partisans alternately praising and deriding the business strategies of Sega's American and Japanese divisions. Part of this is undoubtedly sensationalism, but the root cause for such divergent opinions lie within

Sega itself, and its policy of expending resources to promote divergent business and design philosophies in different markets.

This report examines the effect that conflicting market perceptions had on the development of Sega's games, specifically focusing on the "Virtua Fighter" series. Currently in its third iteration, the arcade version of 'Virtua Fighter 3' consistently outperformed all other arcade games in Japan for several years, and "Virtua Fighter 4" remains on top of Japanese most wanted game lists. The series is also popular in Hong Kong and Korea, but presence in the US and Europe is effectively nil. It is *not* an examination of cultural differences; rather, it focuses on the consequences of business strategies which we depict as an outgrowth of economic factors, rather than cultural ones^{iv}.

Overview of Sega Corporate History, 1951 - Present

Sega was founded by David Rosen as Rosen Enterprises in 1951. Originally an art exporter, the company entered the coin-op business in 1957, exporting used target-gun machines from the US to Japan. Subsequent success resulted in a merger with a jukebox manufacturing company, Nihon Goraku Busan, in 1965. Rosen remained president of the company, but the merged company eventually became entirely Japanese in management structure and personnel. The new name selected for the merged company was a contraction of "Service Games", a term used by Nihon Goraku Busan to refer to its philosophy of manufacturing games to "serve" the population. This name was Sega, which remains the company's brand name today.

The historical events most relevant to this report occur after 1966, when Sega released its first domestically produced arcade game, *Periscope*. The success of this game led to a subsequent purchase of the company by Gulf and Western (Rosen remained president of the company). An abortive attempt to establish a US presence was made during this period, but the company performed poorly as a consequence of the videogame crash in 1983, and sold its US branch, Sega Enterprises, in 1984. Sega of Japan was bought back for \$84 million by Rosen and an entrepreneur, Hayao Nakayama, who Rosen had first met when purchasing Nakayama's company in 1979. The two of them established a separate US branch, Sega of America (SOA), which Rosen became President of; Nakayama became President of Sega of Japan (SOJ). In 1991, Tom Kalinske, a former executive at Mattel, took over as President of SOA; the three men were to remain with the company until 1996, when Rosen retired, Nakayama resigned and Kalinske was fired. All three actions were presumably due to the poor performance of the Saturn console, which we detail below.

Following the bankruptcy of Sega Enterprises, Sega of Japan appropriated the Sega Enterprises name, laying the foundation for Sega's corporate structure today. Sega Enterprises is currently divided into three regional companies^v: Sega of Japan^{vi}, Sega of America and Sega Europe. American and European divisions became subordinate to the Japanese one with Rosen's departure as SOA President. In-house software development is handled through 10 internal, independent divisions, including Sonic Team, which handles console development, and the AM teams, numbered from AM1-9^{vii}. Practically all of Sega's flagship software titles since 1985 have come from the AM teams, and I argue that the decentralized, independent structure of these teams illustrates a

characteristic business strategy which would subsequently lead to Sega's console failure. Essentially, Sega operates on the principle of 'survival of the fittest': the company allows parallel development of divergent ideas, and then picks the most successful version and forcibly aligns the company behind it^{viii}.

Design foundations: 'Street Fighter II', 1991

Virtua Fighter (VF) follows the standard conventions of the fighting game genre, and is the first example of the 3-D fighting game currently represented by series such as 'Tekken', 'Dead or Alive' and 'Virtua Fighter' itself, which have come to dominate the genre. The representative features of a fighting game and the development of the genre to 1991, when Street Fighter II was published were covered in my review of Street Fighter II, and will not be repeated here^{ix}.

When Street Fighter II was published in March 1991, the Genesis had been in circulation for two years, and was making a strong showing in the console market^x. "Sonic the Hedgehog" was published in this year, creating a 'killer app' that helped drive sales. The success of Street Fighter II (SFII), however, was initially in the arcades, and was sufficiently overpowering that a marketable fighting game became an imperative for Sega, not only to ensure dominance in the arcade market, but in the console one as well.

To understand this, we note that historically arcade games have been precursors to console translations or derivatives. At any point in time, new arcade games are more expensive^{xi} to purchase and play. If an arcade game is popular, it is then translated into console form; the phenomenon is analogous to the movie industry, where a film appears first in theatres and then, after demand begins to flag, moved to home video. The primary

difference between the two industries is that ‘scaling down’ is not always possible for an arcade game: console hardware can be incapable of a decent translation, or so difficult to translate to that the costs become prohibitively large^{xii}. In this case, a lag of several years before translation typically occurs.

The lack of Sega fighting games was thus a serious deficiency in 1991, since it made Sega vulnerable both in the arcades and in the console market. Entering the genre late, Sega was unable to meet the sudden demand for fighting games without at least a nine month to one year lag^{xiii}. The general industry trend of producing ‘clones’ had already begun: SNK’s ‘Fatal Fury’ (November 1991) and Midway’s ‘Mortal Kombat’ (1992) essentially followed the standard SFII paradigm of sprite-based gameplay with minor modifications. Mortal Kombat was particularly notable, introducing the now-infamous ‘Fatality’, which allowed the player to ‘finish’ a defeated opponent in a variety of graphically gory ways.

‘Virtua Fighter’, when finally published in 1993, would depart from this sprite-based paradigm by utilizing 3-D polygonal graphics and a hybrid 3-D movement scheme. However, the game was the culmination of a particular design philosophy within the company which conflicted with other divisions, as demonstrated by proposals to create a Sega fighting game in 1991:

- The AM teams were focused on the arcade market. In this arena, porting or developing products similar to or derivative from Street Fighter II would have limited impact. They wanted to develop a fighting game that diverged significantly from Street Fighter II (i.e. VF).

- SOA pushed for a Street Fighter II clone with presumably superior gameplay and depth, essentially following the sprite-based paradigm in the manner of ‘Fatal Fury’ and ‘Mortal Kombat’.
- Some divisions argued for a direct translation of Street Fighter II to the Genesis.

Since SFII could not be translated to the Genesis^{xiv}, the remaining two philosophies were both pursued, generating two different fighting games, driven by different divisions, which culminated in separate product lines. The three-dimensional line of development, spearheaded by AM2, led to VF; the SFII-based line of development driven by SOA led to ‘Eternal Champions’.

Initial Experiments: 1991 – 1993

The two main fighting games released by Sega in the two-year period before ‘Eternal Champions’ and ‘Virtua Fighter’ in 1993 illustrate the separate threads of console, SFII-like gameplay and the move towards 3-D graphics^{xv}. ‘Dark Edge’, released only in Japan, represents design trends leading to ‘Virtua Fighter’, with ‘Cyborg Justice’ filling a similar role for ‘Eternal Champions’.

‘Dark Edge’ was published on Sega’s System 32 arcade board in March 1993. It took advantage of the scaling abilities of the System 32 board to create sprite-based characters which scaled smoothly into and out of the screen and could be viewed from different angles. Backgrounds were still sprite-based; additional three-dimensionality was provided by the addition of “ground objects” which scaled along with the sprite-based characters. Unlike later 3-D games (and VF itself), ‘Dark Edge’ allowed full three-

dimensional motion. The joystick controlled motion along two axes^{xvi} unlike the one-dimensional axis of SFII; vertical joystick motions, instead of representing crouching and jumping, now enabled horizontal movement. Jumping was accomplished in ‘Dark Edge’ by pressing a button, a convention which almost all fighting games have since avoided.

‘Cyborg Justice’, published on the Genesis in mid-1993, implemented sprite-based characters in a 2-D setting, but also implemented features of another genre – the side-scrolling fighting game, epitomized by games such as ‘Final Fight’ and ‘Streets of Rage’. The game provided both one-on-one and side-scrolling functionality, alternating fixed-arena, one-on-one battles with side-scrolling, multiple-opponent segments.

‘Eternal Champions’: Fall 1993

Both ‘Dark Edge’ and ‘Cyborg Justice’ exhibit similar design arcs leading to their respective culmination in ‘Virtua Fighter’ and ‘Eternal Champions’. In both cases, new elements were added to the basic paradigm of the fighting game – side-scrolling elements in ‘Eternal Champions’ and 3-D functionality in ‘Dark Edge’. When these games failed in the marketplace, Sega eliminated or toned down the changes it had made, a tendency it would repeat in the hardware arena (described below).

For ‘Eternal Champions’, developed by SOA and published only for the Genesis, side-scrolling features were scrapped altogether. Keeping in line with the original ‘clone’ plan from SOA, ‘Eternal Champions’ became a sprite-based, 2-D clone of Street Fighter II with superior graphics and features taken from other fighting games, such as the ‘Fatality’ feature from Mortal Kombat. The game was extremely successful, but limited to the American marketplace since it was published only on the Genesis.

‘Virtua Fighter’: November 1993 (Japanese release)

‘Virtua Fighter’ exhibits the same design tendency as ‘Eternal Champions’ in that the additional functionality introduced in its predecessor was largely scrapped in favour of a more conservative approach.

For Virtua Fighter, the three-dimensional aspect of the graphics were greatly increased. For the first time, characters were depicted polygonally, and arenas for the game were represented using true 3-D models, unlike ‘Dark Edge’, which simply utilized an infinite (sprite) plane. This enabled a new gameplay feature – the ‘Ring Out’, where a player knocked off the arena (which would be modelled as a raft, boxing ring or stage) would automatically forfeit the round.

However, although the game had evolved graphically, many of the gameplay elements introduced in ‘Dark Edge’ were scrapped. Character movement, although in a true 3-D space, was again oriented along a one-dimensional axis towards the opponent. If a player wanted to move sideways (perpendicular relative to the direction of the opponent) a special ‘sidestep’ move was needed. In addition to this, the majority of commands in the game automatically oriented the player so that they were either facing or back turned to the opponent. The SFII model of jumping and crouching using the joystick was thus reinstated and the alleged ‘3-D’ gameplay was actually more of a hybrid 2-D/3-D design, with only limited movement along a third axis.

This ‘hybrid’ design was to become the model for future polygon-based 3-D games such as ‘Tekken’, ‘Dead or Alive’ and ‘Soul Calibur’, which were all successful in the US market^{xvii}.

Internal Conflict, 1993 - 1995

By 1994, the lifespan of the Genesis was nearing its end and the introduction of the Sony Playstation, a 32-bit console, was becoming a significant threat to Sega's position in the console market. In keeping with the design trend examined earlier, different divisions were permitted to submit design proposals for a 32-bit console, and four different proposals were submitted, *three* of which were implemented^{xviii} by Sega:

- Project Neptune was an upgraded Genesis console with 32-bit processing and advanced audiovisual capabilities.
- Project Saturn, which evolved into the Sega Saturn, was designed by the Japanese and eventually became the dominant 32-bit Sega console. Unlike the Genesis, it utilized CD-ROM technology instead of cartridges.
- Project Mars, which became the Sega 32X, was designed by SOA, although it was eventually manufactured in Japan. It was not an independent console and functioned only as a 32-bit add-on to the Genesis.

Since the Saturn / Mars conflict relates directly to VF, we ignore the Neptune in this report^{xix}.

The Mars/32X was proposed on 8th January 1994 in a hotel room in Las Vegas^{xx}. Nakayama, Kalinske^{xxi}, Sato (SOJ), Paul Rioux (SOA) and Joe Miller, CTO of SOA, were all present. Miller describes the meeting:

Quite simply, Nakayama directed the company to design and produce a cartridge-based 32-bit platform and bring it to market before the Christmas selling season of 1994.

This was a lengthy, somewhat heated meeting - but in the end there was no question that SOJ (in the form of a classic Nakayama mandate) had determined that this was what we were going to do . . . the difference, this time, was that SOJ was actually inviting SOA into the process, instead of creating new platforms in a vacuum and throwing them over the ocean at us when it was too late to have meaningful input . . . [SOJ] was completely committed . . . to finish the design and produce it in quantity for Christmas.

We note the bias towards SOA which Miller, who was eventually placed in charge of the 32X, undoubtedly has referring to a 'classic Nakayama mandate'. However, it is undisputed that although SOA was placed in charge of all aspects of the 32X project, they were kept in the dark regarding a parallel Japanese project that essentially duplicated the 32X ('Project Jupiter'). Eventually conceding this redundancy, 'Jupiter' was scrapped in favour of the 32X; as described below, the Genesis/32X was then abandoned in favour of the Saturn. In addition to this, Sega would discard 'Eternal Champions' to support 'Virtua Fighter'.

Production of the 32X began in September, with SOA predicting sales of 1 million units by Christmas 1994. SOA devoted a great deal of resources to the Genesis/32X, releasing the sequel "Eternal Champions: Challenge from the Dark Side" for the Genesis in 1995. The Japanese, on the other hand, devoted resources to the Saturn console and its arcade counterpart, the Titan board, preparing the Saturn for a US launch in September 1995^{xxii}.

The takeover of SOA, the failure of the Saturn and its consequences

A disparity in corporate strategy was now publicly visible within Sega. The 32X was not successful, and Kalinske was held responsible for the failure of the 32X. Despite this, SOA continued to support the Genesis and 'Eternal Champions: Challenge from the

Dark Side' had gained significant popularity with the American market; SOA was planning a third 'Eternal Champions' for the Saturn. SOJ, on the other hand, fresh from a successful Japanese launch^{xxiii}, was promoting the Saturn^{xxiv} as Sega's 32-bit console, along with the Saturn port of VF.

'Virtua Fighter 2' (VF2) was released in Japanese arcades in early 1995. Using the Model 2 arcade board it was a hit in Japan. The game's success and news of a Saturn port for Virtua Fighter 2 detracted from SOA and lent credence to Japanese opinion that the 32X and Genesis were failing. Nakayama was convinced that the Saturn launch needed to be accelerated in the US to combat the Playstation, and ordered Kalinske to accelerate the Saturn launch. Kalinske and many SOA executives objected, citing a lack of software and higher retail prices if the console were accelerated, but were all overruled by Nakayama.

On May 11th, Kalinske was forced to announce immediate sales of the Saturn at the keynote address of E3, packaged with a copy of the 'Virtua Fighter' port, at a price of \$399. He was followed by Sony president Olaf Olafsson, who asked Steve Race, one of the Playstation developers, to give a technical talk on the Playstation.

Race said only one thing: "\$299".

The Saturn failed in the US. Only two games were published between May and September, and sales were stagnant from the launch onward. In an attempt to build support for the VF franchise, Nakayama informed SOA that the 'Eternal Champions' series would not be allowed to compete with 'Virtua Fighter' for attention with the gaming media. SOA responded with an letter writing campaign to save the series, which failed to convince SOJ; 'Eternal Champions' was scrapped and the translation of VF2

was released for the Saturn in July 1995. Poor Saturn penetration, however, crippled sales of the game^{xxv}.

In addition to this, in a final assertion of authority, Nakayama announced in October 1995 that Sega would immediately cease development for the Genesis in order to devote all resources to the Saturn. Although this helped SOJ considerably, SOA's support for the Genesis was immediately terminated. American consumers, who were expecting new Genesis titles, and those who had spent money on the 32X, were irrevocably alienated from SOA by this move, and Saturn sales in the US suffered as a result.

Aftermath: 1995-1996

SOJ, in an attempt to realign the company to a single strategy, had effectively taken over the operations of SOA. Kalinske took the blame for Sega's failure in the US, and his responsibilities were gradually removed. By 1996, by some accounts, he had been reduced to 'staring out the window of his office'.

Kalinske tendered his resignation in July 1996. He was followed by Rosen and Nakayama, who resigned his position as co-chairman of SOA. A fresh executive from Sony, Bernie Stolar, replaced Kalinske, and under his supervision 'Virtua Fighter 3'^{xxvi} was introduced to US arcades in 1996. The launch was again unsuccessful; a Virtua Fighter 3 machine cost \$14,000 to purchase, and was shipped in an extra-large console which was difficult to move and place^{xxvii}. Arcade managers were forced to raise the price per game to a dollar, effectively destroying demand, even after the price was reduced to 50 and then 25 cents.

'Virtua Fighter 3' was translated for the Dreamcast in 1998.

Conclusion: The lessons of 'Virtua Fighter' for game design

The commercial success of the 'Virtua Fighter' series, as described above, is mixed at best. The immense popularity of the game in Korea and Japan is tempered by competition from other fighting game series such as 'Tekken', 'Soul Calibur' and 'Dead or Alive', as well as the game's irrelevance in the US and Europe.

The influence of the series on future games, however, is relatively obvious. 'Virtua Fighter' was the first fighting game to utilize polygonal 3-D graphics in character and background rendering. It was also the first fighting game to model an polygonal environment and utilize it as a gameplay constraint (the 'Ring Out' feature); in addition to this, the basic 'hybrid' movement paradigm which it utilizes has been used without modification in every major polygonal fighting game to date.

The development process of 'Virtua Fighter' provides a rather ambiguous perspective on game design. Sega is one of the largest software and hardware developers in the industry, and it may initially seem that criticism of Sega's multiple-thread development style is relevant only for companies of similar scope with international operations, such as Nintendo, Sony and EA. In addition to this, the history of 'Virtua Fighter' is inextricably linked with the history of Sega's hardware development and corporate culture, and isolating 'Virtua Fighter' from this background to provide a criticism of software development styles is difficult.

However, I believe that the development of 'Virtua Fighter' is still relevant to current trends in the game business. Many smaller software companies have a R&D structure similar to Sega's in structure, if not in scope: Blizzard is an example, divided into Blizzard North and West, and other examples include Bungie and Konami. The most

natural manner of dividing company resources for multiple games is to segregate them in some fashion, usually by game and geographical location. For such companies, 'Virtua Fighter' offers some important basic lessons:

- Demand is limited by the hardware available to play the game, which is relatively obvious. Virtua Fighter's failure in the US is directly linked to the dismal performance of the Saturn.
- Full-blown implementation of a innovative idea will likely fail, as seen in the failure of 'Dark Edge'. A more incremental approach, such as that in 'Virtua Fighter', typically yields better results.
- The parallel development of similar games limits demand. This is not in itself a fault – experimenting with different designs and then picking the 'best' one often results in a good product - but producing multiple design proposals in parallel consumes company resources. In the case of 'Eternal Champions', all the capital expended on the game was effectively lost when the series was cancelled^{xxviii}.

In addition to this, the history of Sega's console development provides a commentary on the proper *amount* of multi-threading which is effective within a company, and at what point this strategy becomes counterproductive. Clearly, Sega's multiple-thread development model is a successful one for software development, as judged by the historical success of Sega games. The mistake made by Sega was primarily one of timing: the two-pronged strategy of the 32X and Saturn was allowed to proceed for too long, creating a market disparity between the US and Japan. Once the flaws in this were recognized, the effort to realign the company behind one console was too extreme

and too late. Kalinske repeatedly made the argument that the Genesis market would be strong in the US until 1996. This is not totally sound - devoting additional resources to the Genesis market 1994-1996 would have ceded the 32-bit market to the Playstation – but once the 32X was established, Sega had reinforced the Genesis market, and regardless of sunk costs, the only profitable alternative was to continue supporting it.

With Sega's departure from the console industry, many of Virtua Fighter's problems with the US market appear to have vanished. 'Virtua Fighter 4' is slated to appear on the Playstation 2.

ⁱ By Peter Moore, president and CEO of Sega of America, on January 31st. According to this announcement, Sega would cease Dreamcast production in March, and end software support for the console by the end of the year. The sudden timing led to massive cuts in Dreamcast prices as vendors attempted to offload their now-obsolete inventory.

ⁱⁱ Sega had spun off all of its software R&D division (the "AM" studios) and its arcade business into separate companies. In addition to this, a rumour had been circulating for some time that Acclaim intended to develop the proprietary Dreamcast game "Crazy Taxi" for the competing Playstation 2.

ⁱⁱⁱ Based on media assumptions and Sega press releases. As a comparison, Playstation 2 sales to date amount to 3 million, Playstation sales to 70 million.

^{iv} This is not to imply that cultural differences did not exist. In an article in Wired Magazine in 1993, "The Next Level: Sega's plans for World Domination", Kalinske pushes an aggressive, "American" marketing strategy to Nakayama, which is eventually accepted because, according to Toyoda (liason between SOA and Japan) "Nakayama understands that when in Rome, you should do as the Romans do.". He goes on to add that "At Sega of America, we have autonomy", a statement which, in retrospect (see below, 1993-1996), seems ironic to the extreme.

We have ignored cultural differences in part due to space limitations and in part due to the lack of primary source material (i.e. interviews with Kalinske, Toyoda et al.), which we were unable to obtain.

^v Information from <http://dorando.emuverse.com/html/sega.html>

^{vi} Sega Enterprises is often referred to as Sega of Japan by the media, but this is actually a misnomer: Sega of Japan refers now only to the subordinate Japanese division, headed by Hideki Sato. The umbrella company, headed by Nakayama until 1996, is called Sega Enterprises.

^{vii} Sega employs from 800-1000 people for software development, according to David Rosen: <http://www.msnbc.com/news/508890.asp#BODY>. AM2 employs 300 of these.

^{viii} A brief overview of the AM divisions::

- AM2, headed by Yu Suzuki, is the most well-known AM division. AM2 was responsible for developing the Virtua Fighter series and its subsequent translations.
- AM4 worked on Virtua Racing and Daytona, and its various ports.
- AM8 is led by Yuji Naka, and worked on Sonic.
- AM9, led by Tetsuya Mizaguchi, designed Sega Rally.

^{ix} Incidentally, "Tongue of the Fatman", which was described as a precursor fighting game, was published for the Genesis.

^x An examination of Sega's history in the console market is relatively important to this report, since a great deal of the tension between SOA and SOJ can (as described in the header) be ascribed to disputes over the Genesis and Saturn. In particular, an examination of Sega's penetration of the console market with the Genesis would help frame the subsequent conflict; unfortunately, this would take a great deal of space. We

restrict ourselves to stating that the Genesis was a 16-bit console with sales of 28million to date, outselling all Sega consoles since, and that it was primarily successful in the US (Source: <http://www.atani-software.net/segabase>).

^{xi} Arcade games can range from a few thousand dollars to \$14,000 for the arcade version of Virtua Fighter 3.

^{xii} As seen later, this is an issue in the translation of Virtua Fighter 3. Other examples are the aforementioned skiing game – the game might be unplayable without special hardware, the cost of which might be too expensive to justify translation to a console.

^{xiii} A typical development cycle for that period.

^{xiv} It subsequently became licensed by Nintendo until 1993.

^{xv} Other fighting games were produced during this period; ‘Holosseum’, for example, used holographic technology and an unconventional game design involving direct player control. ‘Dark Edge’ and ‘Cyborg Justice’ are, however, representative of the two identified design trends and the most representative examples of a ‘fighting game’ available (Cyborg Justice, in fact, contains side-scroller elements), and so we restrict discussion to these two games.

^{xvi} Parallel to and perpendicular to the opponent axis, i.e. perpendicular movement allows a character to move sideways, maintaining a constant distance from the opponent.

^{xvii} Sega’s position on the issue of this hybrid design was that true 3-D movement was too difficult for the player to grasp, and drew attention away from the basic strategic tradeoff between defense and offense in favour of movement strategy. Of the polygonal games mentioned, the only one to be made available on a Sega console was ‘Soul Calibur’. The eventual failure of the ‘Virtua Fighter’ series in the US market thus resulted in continued weakness in the genre for Sega.

^{xviii} A popular media sentiment regarding this strategy was that Sega had “too many planets”, referring to the code names given to these four consoles.

^{xix} For a detailed account of these projects, see <http://www.atani-software.net/segabase/SegaBase/SegaBase-32X.html>, or <http://www.segaweb.com/features/hsc.html> for a less detailed version.

^{xx} Sega executives had been gathered there for the Winter CES conference.

^{xxi} Kalinske, incidentally, was hired in 1991. Fired in 1996 concurrent with the resignations of Nakayama (as co-chairman of SOA) and Rosen, he currently works at Knowledge Enterprises, a software firm.

^{xxii} It had been launched in Japan November 1994.

^{xxiii} Sega claims sales of 1million in the first month of the Japanese Saturn launch (internal SOA memo).

^{xxiv} The Saturn originally ran on a NEC V60 chip at 16MHz. Compare this to the Playstation CPU (R3000A 32bit RISC chip) which runs at 33.8MHz, almost double the speed. According to one Sega staff member, when Nakayama first received design specifications for the Playstation, he was ‘the maddest I have ever seen him’, calling up the entire R&D division to his office to shout at them. An effort was made to compensate by adding another CPU for dual operation; however, this solution made the system so hard to develop for that, according to Yu Suzuki himself, “only 1 out of 100 programmers could use the Saturn to its full potential”.

^{xxv} ‘Virtua Fighter 2’ was still the best-selling Saturn game on record, with 1.7 million copies sold worldwide. Whether a sequel to ‘Eternal Champions’ would have affected sales at all remains questionable.

^{xxvi} ‘Virtua Fighter 3’ was developed for the Model 3 board, which was designed in cooperation with Lockheed Martin.

^{xxvii} The game cost a similar amount in Japan. However, the arcade industry was more developed in Japan, and the series was more successful, and thus the game still managed to turn a profit. Differences in arcade culture between the US and Japan can also account for this difference: in Japan (and Korea), it is common for “clubs” of players to combine resources and buy a single machine outright, which club members then play for free. This helped counteract the effect of high cost-per-game on consumer demand in Japan and Korea.

^{xxviii} As detailed earlier, it is debatable whether ‘Eternal Champions’ would truly have hurt sales of ‘Virtua Fighter’. The point being made remains valid, however.

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Partial listing of AM2 – developed games / timeline

Games listed in the report have been highlighted for ease of reference.

Date	Game	Platform
2000	Shenmue	Dreamcast USA
1999	Shenmue Outrigger	Dreamcast JPN Naomi
1998	Daytona USA 2 Virtua Fighter 3tb Virtua Stricker 2	Model 3 Dreamcast JPN Model 3
1997	All-Japan Pro Wrestling Virtua Fighter 3tb Fighters Megamix	ARC Model 3 Saturn
1996	Fighting Vipers Virtua Fighter 3 <i>Virtua Fighter Kids</i> Virtual Fighter CG V7-10	Saturn USA / JPN Model 3 Model 2 Saturn JPN
1995	<i>Virtua Fighter CG V1-6</i> Virtua Fighter 2 Virtua Cop Virtua Cop 2 Daytona USA	Saturn JPN Saturn JPN Saturn JPN Model 2 Saturn JPN
1994	Virtua Fighter 2 Virtua Fighter Virtua Cop	Model 2 Saturn JPN Model 2
1993	Virtua Fighter F1 Super Lap	Model 1 ARC
1992	Arabian Fighter	ARC
1991	Rent A Hero	Mega Drive
1990	G-LOC GP Rider	Mega Drive ARC
1989	Vermilion	Mega Drive
1988	Dynamite Duke	ARC
1987	After Burner II After Burner	ARC ARC
1986	Hang-On Out-Run	Mark III ARC
1985	Space Harrier	ARC

Source: www.shinforce.com