

FULL 3DCG ANIMATION IN THE JAPANESE FILM INDUSTRY

ACCA4040 - Animation Insight & Perspectives

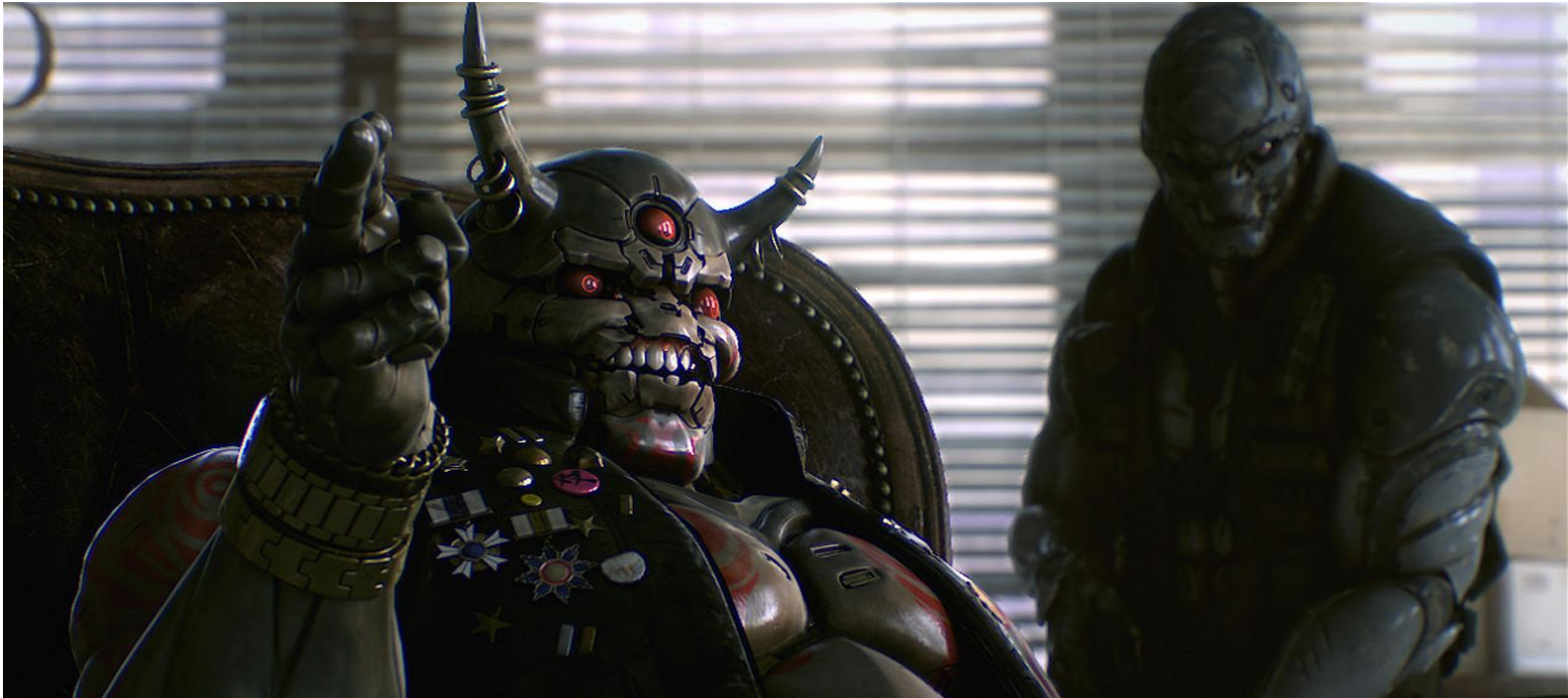


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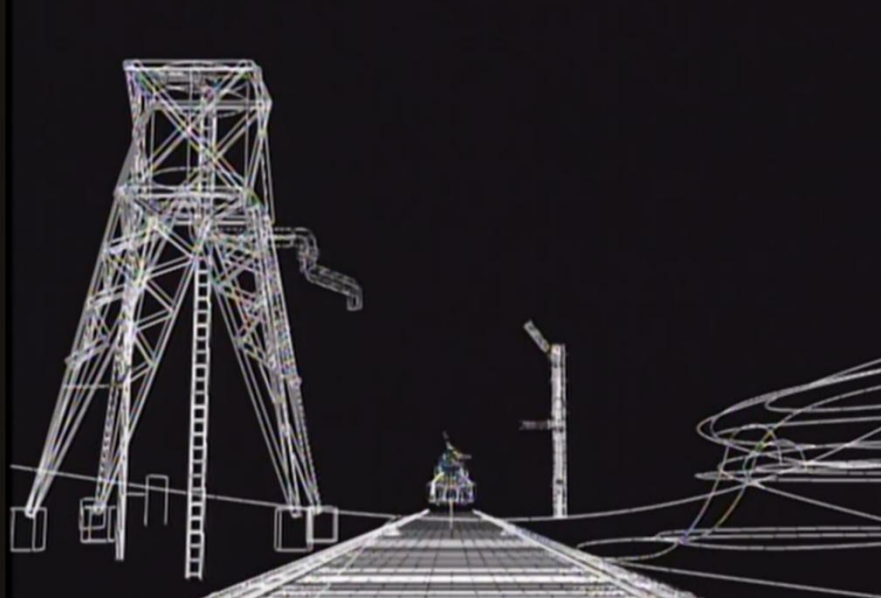
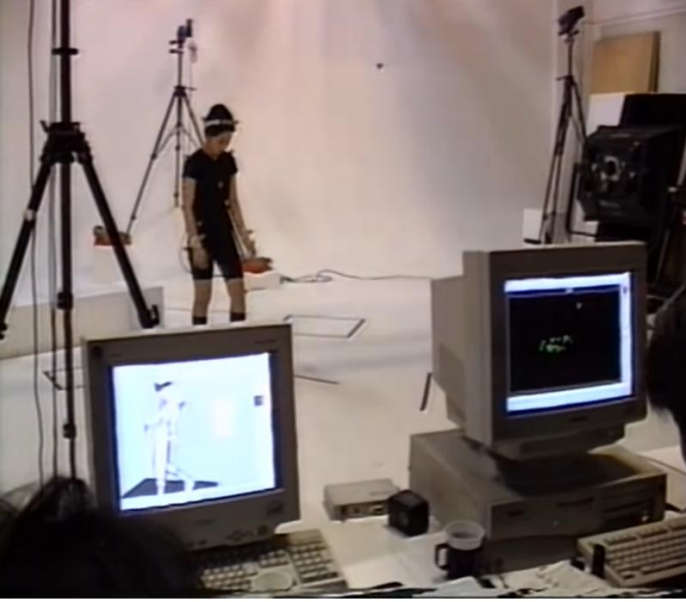
INTRODUCTION

3DCG

This essay describes the semi-realistic 3DCG genre of Japanese Animation, analysing the effects of the industry's development, cultural influences and stylistic trends. Key films will be used to highlight certain industry shifts; however, the scope of topics covered is limited to developments needed to contextualise the focal study, *Appleseed Alpha* (2014), and to explain the trends and history that influenced its production.



Figure 1: Film still from Appleseed Alpha (2016) [1]

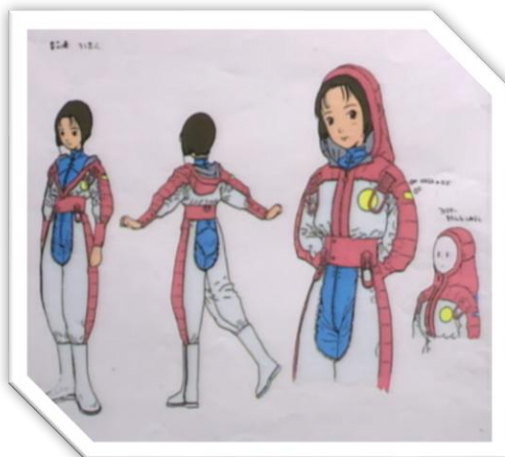


TECHNOLOGICAL DEVELOPMENT

A.L.I.CE

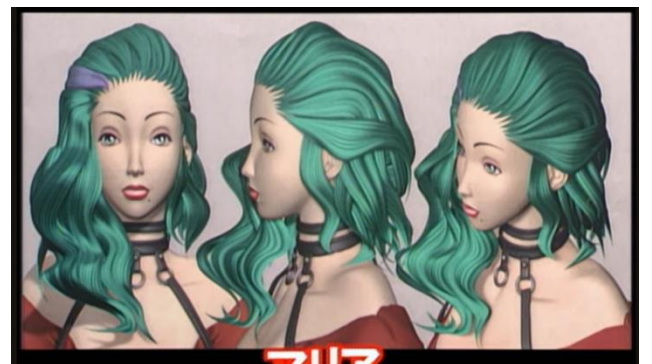
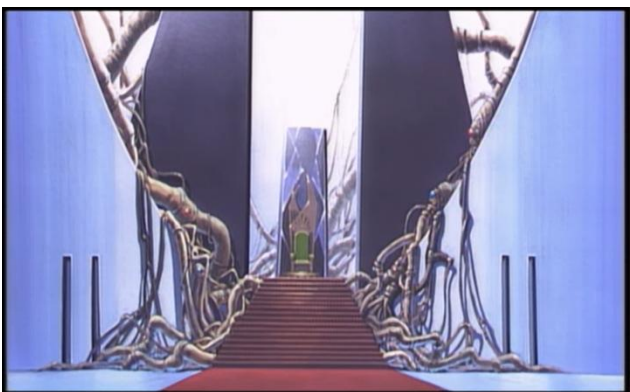
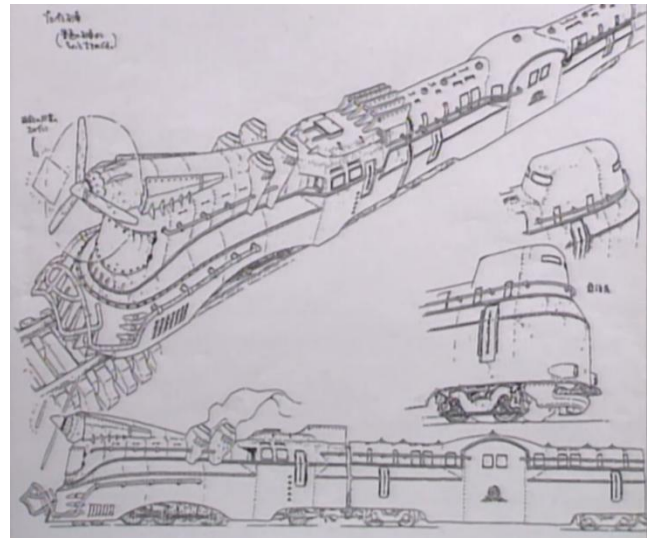
The early development of Japan's 3D animation industry was somewhat stifled, developing differently than the American industry due to the national economy and Japan's pre-established animation industry. The first 3DCG animated film produced in Japan was A.L.I.CE (2000)[5], five years after the release of Toy Story, and a year after Toy Story 2. The delay was mostly due to a lack of incentive to transition to 3D early, with 2D animation being more cost effective in Japan (due to a well-established pipeline and low wages [6]) than it was in the USA. Additionally in the 90s, Japan's economic bubble was collapsing [7], whereas the USA was experiencing an economic boom with more money at the industry's disposal to invest in *emerging* software.

By 1998, there was already some precedent set for 3DCG anime stylisation, however 3D anime characters specifically had been attempted only by Japan's video game industry, such as in Tekken(1994), Final Fantasy 7(1997), and Resident Evil 2(1998). In the 2D industry, 3DCG had only been used for complex perspective or hard-surface objects (e.g. the cars in Initial D), not characters. A.L.I.CE's attempt at translating the style established some early stylistic pitfalls of fully 3D anime, particularly how facial features weren't re-stylised to fit 3D, creating this inconsistent and uncanny combination of realistic and anime features. The models in A.L.I.CE were unappealing, due to the clash of the doll-like proportions with the realistic teeth, the large cartoonish eyes with the realistic nose, etc.



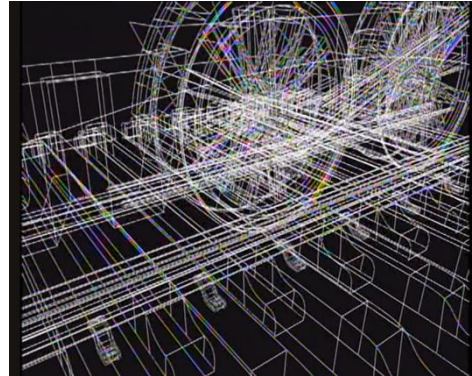
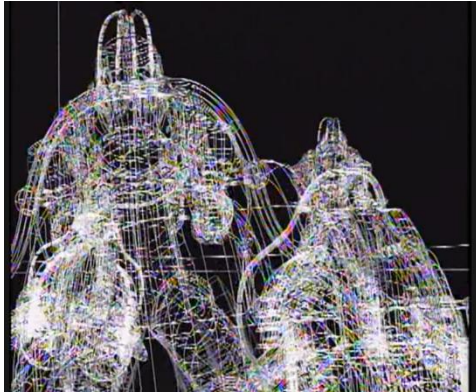
Concept Art and Pre-production of A.L.I.CE [4]

Demonstrating the artistic intention behind A.L.I.CE.



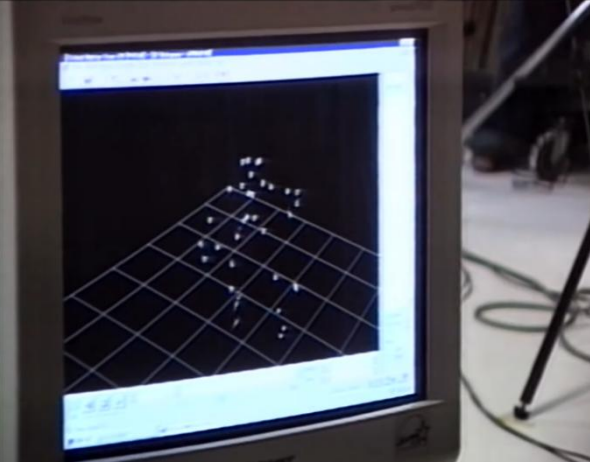
Film Stills & Wireframe [3] [4]

The records of production are limited almost exclusively to the DVD EPK.



A.I. (2000), was shown at the Fantasia 2000 Film Festival.

Scanned Page 9, from the festival program. [42]



Regarding animation, as seen in the DVD EPK, the production of A.LI.CE utilised *both* Optical and Mechanical Motion Capture. This is because whilst Optical Mocap would be fit for purpose for most scenes, Mechanical Motion Capture would be more suitable for scenes where a pose or interaction with another actor or a prop would occlude the optical markers.

Although Magnetic Mocap was available, there is no evidence it was used during the filming of A.LI.CE, and it is rarely used for Japanese 3DCG motion capture. The method is effective in confined spaces, poor lighting conditions [8], or to track an actor's interaction with a prop [9], (as there is no need to worry about occlusion, and magnetic sensors can attach to the prop to provide data). However, Magnetic Mocap is sensitive to metal interference [10] and requires a metal clean room to prevent electromagnetic noise interfering with the data as well as frequent calibration.

It may not have the same limitations of movement (*such as with the Mechanical armatures restricting movement or being easily damaged when capturing falls[9]*), or sightlines (*Optical markers being occluded*) but it is more practical to use both Optical and Mechanical Mocap on a case dependent basis instead.

Figure 14 & 15 : Kaori Shimizu in MetaMotion's 'Gypsy 3' Mechanical Motion Capture suit. [4] [43]



FINAL FANTASY: THE SPIRITS WITHIN

Final Fantasy: The Spirits Within (2001) was in development since 1997, funded solely by SquareSoft and created by Square Pictures. It was the first *feature length* photorealistic 3DCG film released in the world. It is largely responsible for establishing semi-realism as a popular anime art style in Japanese 3DCG, prototyped many now standard elements in large scale ‘photorealistic’ CG production pipeline [40] and was the DNA of its more financially successful predecessor, Final Fantasy: Advent Children (2005).

Square spent \$137 million on production, which is visible. The animation is realistic and high quality. Facial animation was done with shape keys, motion captured performances were optimised and reduced before being sent to animators and a phoneme library was created for the shape of the mouth for lip synching. Hair and fabric would receive secondary animation through Dynamics and keyframing [11] [12], making scenes, such as the ones in zero gravity, convincing.

Unfortunately, despite being successful in stylisation and visual fidelity, the film failed at the box office and was moderately rejected by audiences. The difference in quality between the realism of the models and naturalism of the human animation, with the models achieving better realism than the animation, caused dissonance, with audiences finding it uncanny and off-putting.

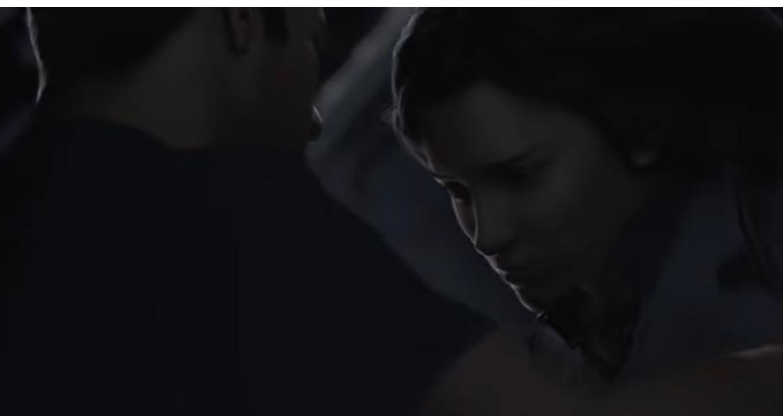


Figure 15: Film Still from Final Fantasy: The spirits within [10]



Figure 16: Motion Capture on moving metal set [13]

3DCG PRODUCTION STUDIOS

A small number of companies produce the bulk of Japanese full 3DCG Film animation. A notable example being, Marza Animation Planet. A 3DCG animation production company, originally the Visual Entertainment R&D department *established by SEGA*, in 2006[14], before being separated into its own subsidiary company in 2009[15]. Creating films such as, Resident Evil: Vendetta, Lupin III: The First, the Sonic the Hedgehog movies, a co-production of Kingsglaive: Final Fantasy XV with the Square Enix Image studio Division in 2016, and Harlock Space Pirate, a film directed by, Shinji Aramaki (Director of the 3DCG Appleseed Films).

As opposed to the US industry, where 3D Film animation largely stemmed from the film VFX pipeline, 3DCG in Japan emerged almost exclusively from Video Game corporations.





Figure 17: Film still from Gantz:0 (2016) [16]

2D TO 3DCG ADAPTATION ISSUES

EMERGENT 3DCG GENRES

The difficulties to adapt and stylise 3D anime continued, however Japanese film productions began to fall into two main genres, Semi-realism and Cel-Shading.

In TV production, 3DCG (as Faux 2D animation) is now widespread [17]. However as high-quality integration is unnoticed, the idea of 3DCG in Japanese TV and Film is often disliked by the public, and bad for marketing [18], as the noticed examples tend to be the failures despite its overwhelming unseen prevalence now in the medium. In TV, the Cel-shaded 3DCG look is most recognised as poor integration, however in the Video Game industry, the style lacks that connotation, and has been reliably executed appealingly, so much so that the aesthetic is not localised to Japanese productions.

SEMI-REALISTIC 3DCG

Figure 18: *Final Fantasy: Advent Children* (2005)

[19]



Figure 19: *Tekken: Blood Vengeance* (2011)

[20]



Figure 20: *Starship Troopers: Invasion* (2012)

[21]



Figure 21: *Gantz:0* (2016)

[16]



Figure 22: *Resident Evil: Vendetta* (2017)

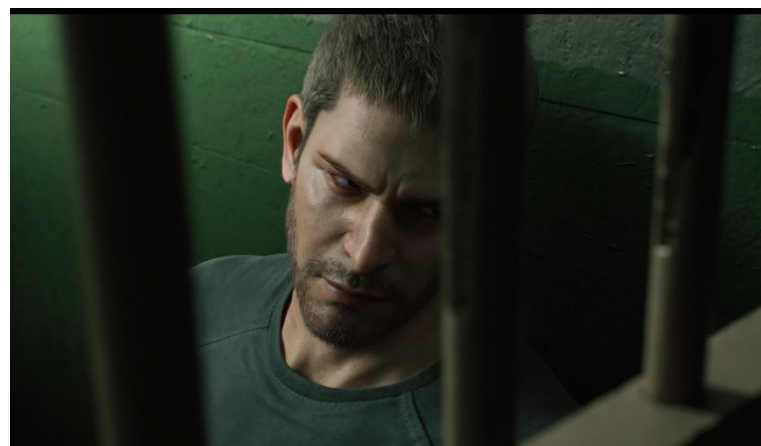
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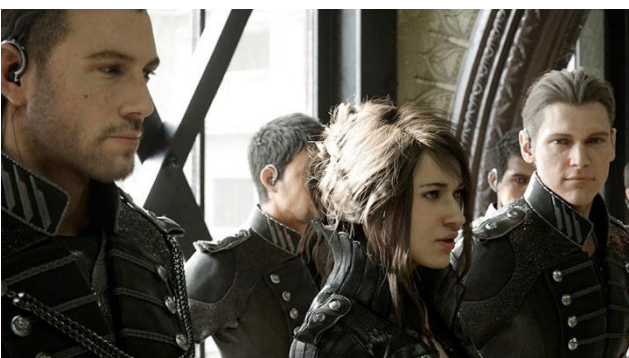
RESIDENT EVIL: DEATH ISLAND [23]

Resident Evil: Death Island (2023) is an interesting example, as the skin textures and lighting were so photoreal that the film dipped into the uncanny valley. They had overcome some of the previous technical limitations of the genre that had been contributing to its stylised aesthetic, such as the simulated tendons under the skin, subsurface scattering with higher accuracy and the Directors attempt to emulate live action set lighting [24].

The look of the film did vary, as some less important scenes were more 'plasticky' as opposed to tip-toeing full realism, likely due to render budget.



The film *Kingsglaive: Final Fantasy XV* (2016), ran into a similar issue due to the high fidelity of the hair, light and faces. However, production aimed for full realism as opposed to semi-realism, the subtler stylisation of the faces, reduced the dissonance and uncanny valley. [25]





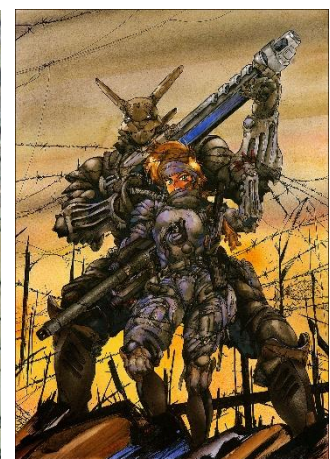
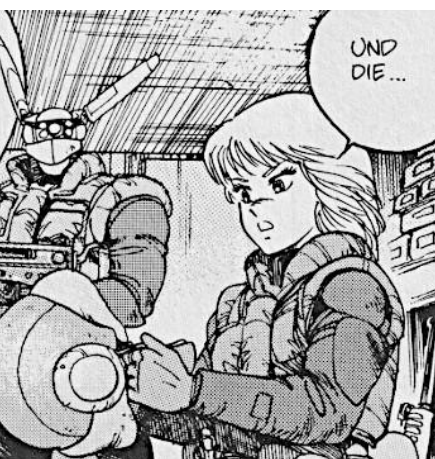
ART DIRECTION

SOURCE MATERIAL

Appleseed(2004) was influential within the Japanese 3DCG industry as its success added legitimacy to the idea that 3D could be effectively stylised as cel-shaded anime, and that it was viable as a feature length.

The Appleseed franchise was based on the manga by Masamune Shirow, who let both Ghost in the Shell and Appleseed receive full 3DCG adaptations from Director Shinji Aramaki. Appleseed was ideal for adaptation; the Mecha genre was well suited for 3DCG due to the complex mechanical designs, which played to all the strengths of the early tech available.

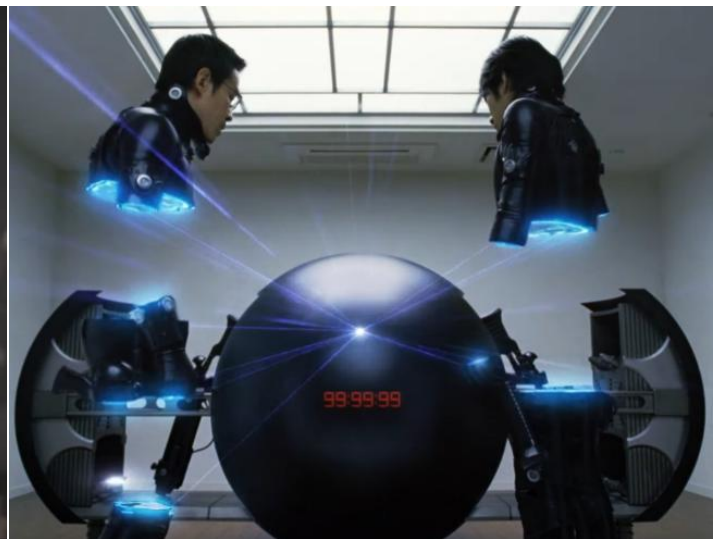
When adapting from a manga, it is important to consider the limitations of each medium during translation. For instance, it could be argued that manga and anime lend themselves to more exaggeration than 3D can, however Aramaki described that it is important and still achievable in 3DCG [26], with methods similar to how exaggeration is achieved in live action productions.



GANTZ

The 3DCG GANTZ film, *Gantz:0*(2016), was helped by the abundance of source material. They had reference material from every medium, being the original manga, and most importantly, the anime and live action adaptations.

The blue lights accenting the guns, were a tried and tested creative decision from the live action. The faces were direct adaptations from the manga, and the effect ‘3D-printing’ the bodies, had already been interpreted by both the anime and the live action, allowing *Gantz:0* to use a combination demonstrating the best of both, with superior sound design.

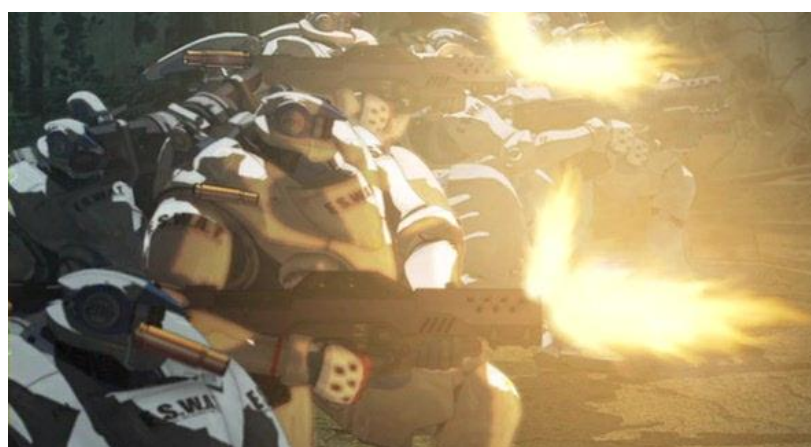
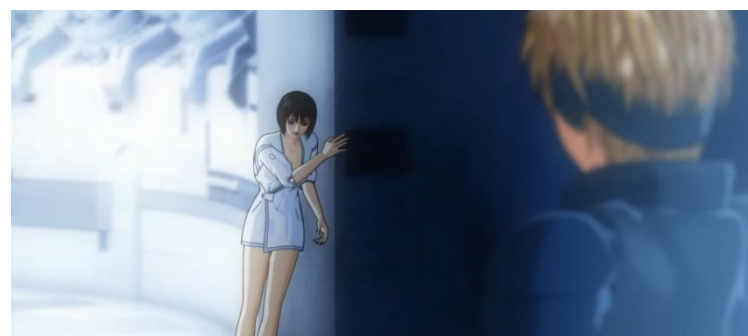




APPLESEED (2004)

The first 3DCG Appleseed film was directed by Shinji Aramaki, in the Cel-shaded style.

Aramaki, when describing the production, accentuated how, during the 2000s, “games had a lot of power, and cutscenes were popular, following that trend, we thought ‘maybe we can do something the length of a movie?’”. He described how all the staff on set were young people in their 20s, who’s only experience was video production with games. [27]





APPLESEED: EX MACHINA (2007)

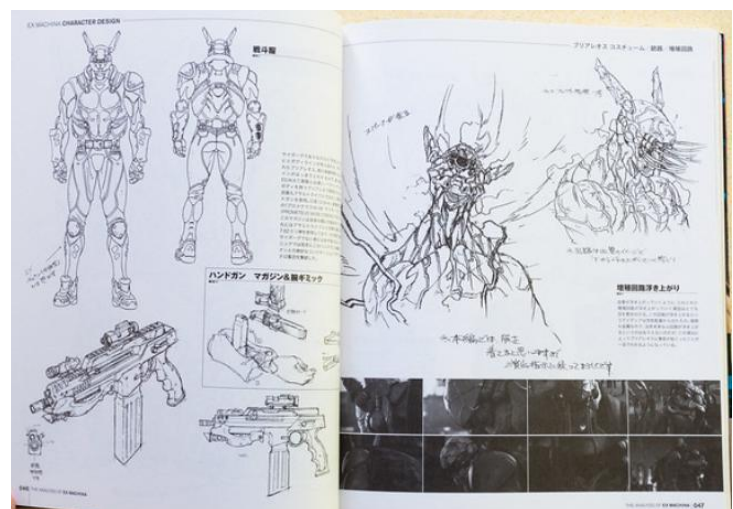
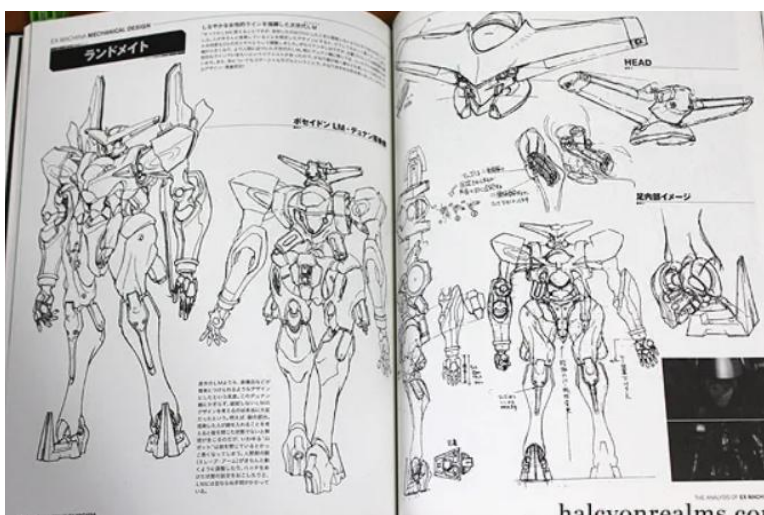
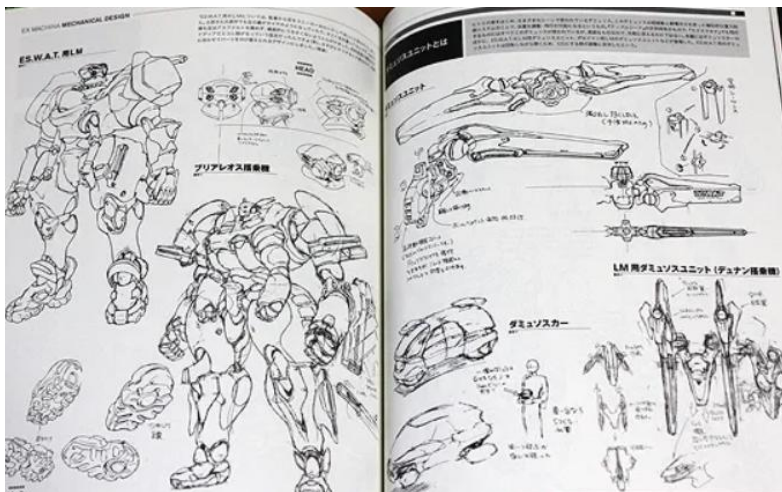
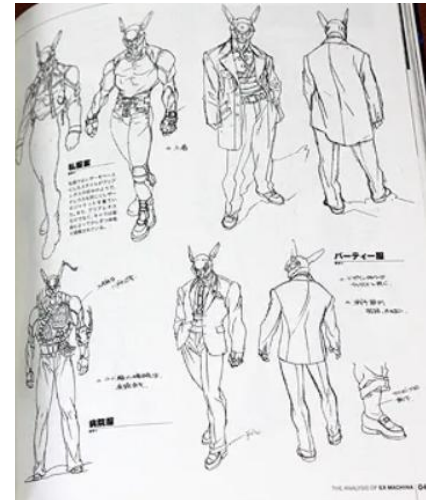
Appleseed: Ex Machina (2007) was more visually refined, with a cohesive 'manga cover art' level of detail. This again leant itself to the benefits of 3D, where more detailed anime styles are practical to animate.

The facial design and animations in Ex-Machina were much improved. Aramaki described how the audience of the first film felt 'their attempt to emulate reality was missing something' and was 'too clean and too cold'. [29]

Aramaki described how, the style had been an attempt to create something that looked like hand drawn animation using CG.



Mecha & Cyborg Designs for Appleseed(2004) & Appleseed: Ex Machina(2007)



SHINJI ARAMAKI

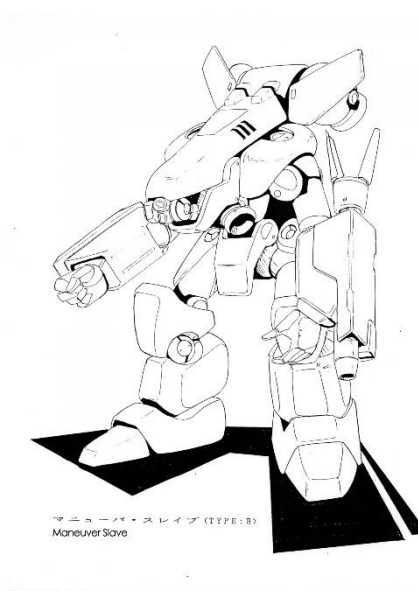
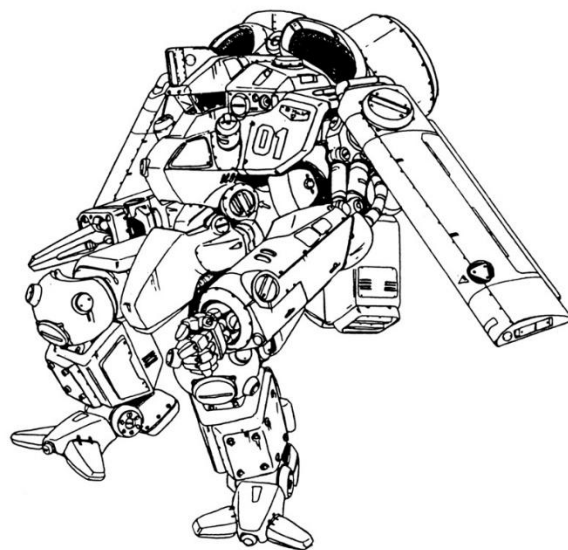
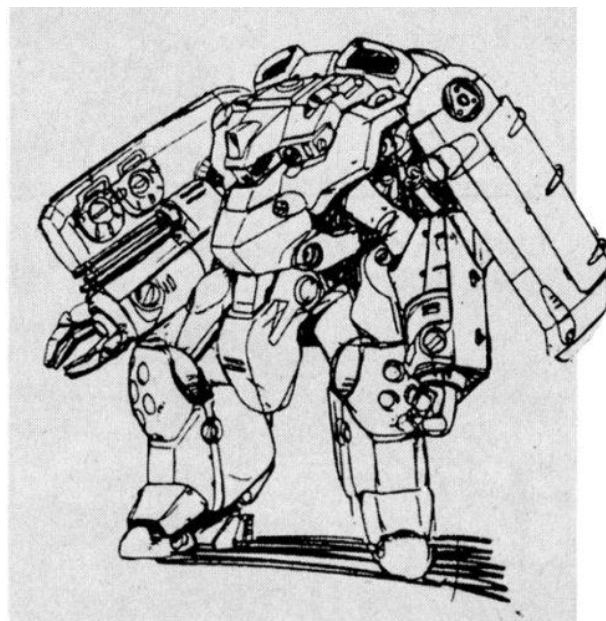
Shinji Aramaki is the auteur behind the 3DCG Appleseed adaptations.

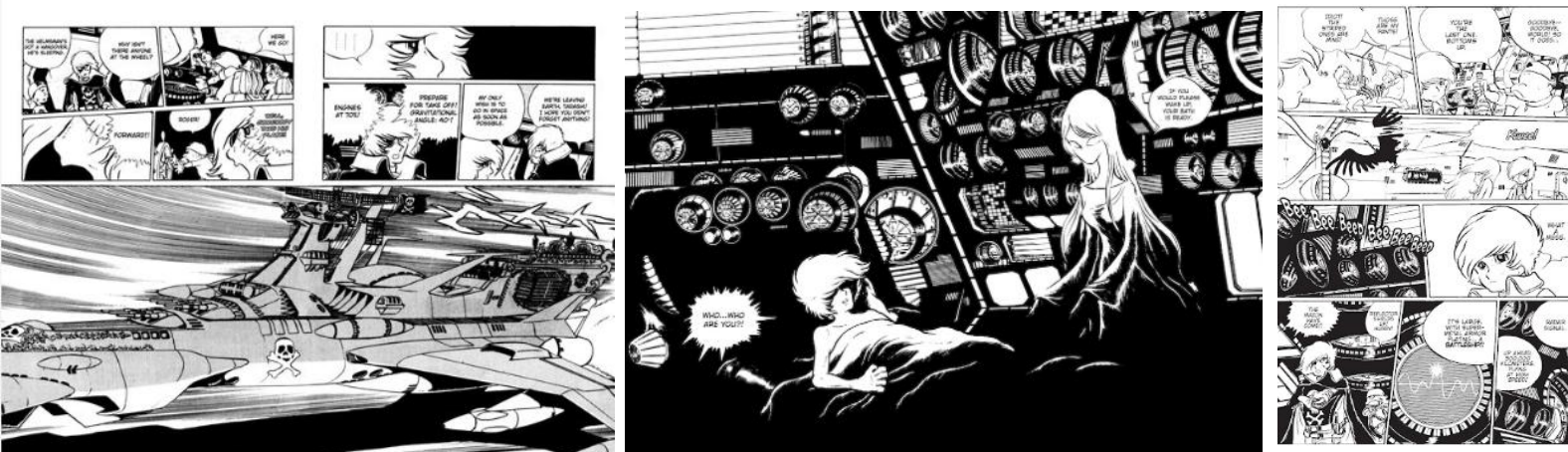
His career began in the 1980s[24], during the peak of Japan's economic bubble[7]. The overinflated stock prices meant production companies were able to finance the creation of many OVA's (OVA stands for Original Video Animation, meaning direct to DVD, however in Japan it was without the negative connotation), leading to a temporary boom in the industry. At this time, Shinji Aramaki began his work as a mecha designer for Artmic, one of the many Japanese production studios catching the wave by producing OVA's.

He described how, when designing mechs, "it felt unreasonable to ask animators to draw complex mechs by hand, so [he] started working with digital technology and CG in the 1990's". [24]

In 2010, he cofounded Solas Digital Arts as Chief Creative Officer (CCO), the 3DCG production company responsible for the 3DCG Starship Troopers films, Ghost in the Shell: SAC, etc...

In the interim between Ex machina and Appleseed, Aramaki had done two projects, being Starship Troopers: Invasion, and most notably Harlock: Space Pirate, both full 3DCG semi-real projects that heavily influenced the eventual aesthetics, pipeline, and production of Appleseed Alpha.





HARLOCK: SPACE PIRATE

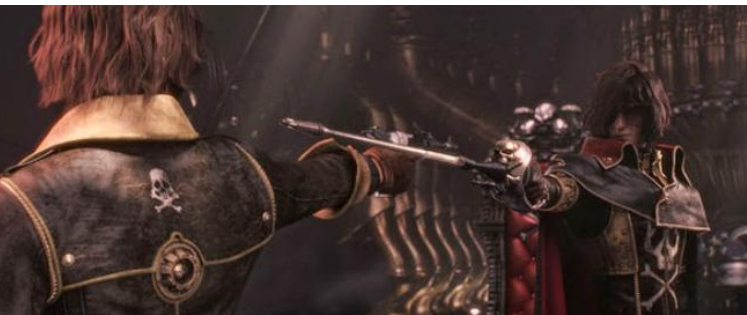
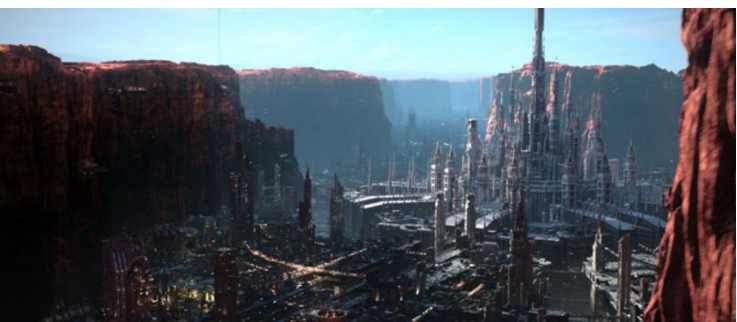
Though not Aramaki's first *semi-realistic* 3DCG project, it was a high-profile release, and the most expensive Japanese 3DCG film ever made.

The film is based on the Manga, Captain Harlock, and the concept art was made in the style of baroque paintings.

Aramaki described how in Harlock: Space Pirate(2013), 'we perfected realism'. And that around that time, the games industry and live action films had become very realistic with their CG, causing 3D animated works to try to once again look hand drawn. He posed the idea, that after the methodology had been established and standardised all over the world for realism, that there was a stylistic reversal to a more 'crafted feel' such as in the Spider-Verse series. [27]



Concept Art of Harlock: Space Pirate & Film Stills





APPLESEED ALPHA (2016)

Appleseed Alpha was the matured form of the semi-realistic 3DCG anime genre. Aramaki described his goal for this film to be, “How far CG animation can go with a photorealistic look”. The switch of style from cell-shaded to photorealism was somewhat jarring to some fans, however it was the logical conclusion of Aramaki’s career trajectory.

The high fidelity of the robots was visually stunning, and the retained stylisation of the characters, with smooth faces and the correct balance of realism, the uncanny valley was avoided whilst maintaining anime stylisation. The production correctly assessed that they could go further with the realism of the mech’s and cyborgs without aesthetic issue.

For the original Appleseed(2004), Aramaki had discussed how the release opened his eyes to 3DCG anime being viable for international audiences. Films thenceforth, particularly Harlock: Space Pirate and Appleseed Alpha catered to an international audience.



Appleseed Alpha Concept Art by Hiro Ueno.



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