

**STORY VISUALIZING THROUGH MODELING, TEXTURING AND LOOK
DEVELOPMENT FOR 3D ANIMATED SHORT FILM- "ADWAR"**

BY

**Tonmoy Baroi
ID: 181-40-464**

This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Multimedia and Creative Technology

Supervised By

Dr. Shaikh Muhammad Allayear
Professor & Head
Department of Multimedia and Creative Technology
Daffodil International University



DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

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APPROVAL

This Project titled **Story Visualizing Through Modeling, Texturing and Look Development For 3d Animated Short Film- “Adwar”**, submitted by Tonmoy Baroi ID:181-40-464 to the Department of Multimedia and Creative Technology, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Multimedia and Creative Technology and approved as to its style and contents. The presentation has been held on 13th February 2022.



BOARD OF EXAMINERS

Dr. Sheikh Muhammad Allayear

Professor & Head

Department of Multimedia and Creative Technology

Faculty of Science & Information Technology

Daffodil International University

Chairman

Arif Ahmed

Associate Professor

Department of Multimedia and Creative Technology

Faculty of Science & Information Technology

Daffodil International University

Internal Examiner

Md. Samaun Hasan

Assistant Professor

Department of Multimedia and Creative Technology

Faculty of Science & Information Technology

Daffodil International University

Internal Examiner

Dr. Mohammad Zahidur Rahman

Professor

Department of Computer Science and Engineering

Jahangirnagar University

External Examiner

DECLARATION

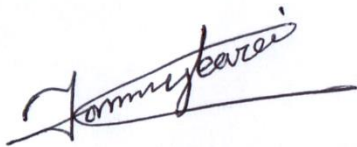
I hereby declare that, this project has been done by me under the supervision of **Dr. Shaikh Muhammad Allayear, Professor & Head, Department of MCT** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:



Dr. Shaikh Muhammad Allayear
Professor & Head
Department of Multimedia and Creative Technology
Daffodil International University

Submitted by:



Tonmoy Baroi
ID: 181-40-464
Department of Multimedia and Creative Technology
Daffodil International University

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I would like to express my heartiest gratitude to my team mate, S. M. Monowar Kayser for his tremendous help to finish our project.

I would like to thank the entire faculty member and the staff of MCT department of Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must acknowledge with due respect the constant support and patients of my parents and other family members.

ABSTRACT

ADWAR is a 3D animation short film developed by Tonmoy Baroi and S. M. Monowar Kayser. It's a science fiction story about a rover named ADWAR discovering a new planet that serves as a metaphor for a certain feeling in human existence. Meanwhile, ADWAR found a companion rover named CK-32. However, ADWAR abruptly loses his companionship and returns to his lonely existence. ADWAR advances and ultimately learns something new.

The primary purpose of this little film is to motivate our younger generation, who is particularly susceptible to despair. Existence has its own taste, and individuals must advance in order to fully appreciate the wonder of existence.

The making of the film took around three months to complete. All stages of production have been thoroughly supervised, including pre-production, production, and post-production. It highlights several significant aspects of the project's development, including conducting research on a different planet, managing a large number of polygons, optimizing 3D environment scenes, maintaining a seamless look, using unusual camera angles and a camera rig, utilizing cloud rendering, creating a unique sound design, maximizing monitor resolution, managing the entire project with free tools, and ACES color management.

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CHAPTER 1

INTRODUCTION

1.1 Background

Visualization is a powerful technique for conveying information to an audience. Nowadays, animated films are gaining worldwide popularity as one of the most crucial forms of visual communication. As a result, everyone who looks around will see that the animation industry is growing on a daily basis. Precedence Research estimates that the worldwide animation business will be worth around 642.5 billion dollars by 2030. On the other hand, despite the presence of certain independent artists, the number of animation enterprises and the quality of work in our own nation are very restricted. Quality education and employment are now in high demand in order to participate in and reap the rewards of the global animation industry. Certain flaws in this enterprise are already apparent. A scarcity of high-quality and competent artists has the potential to wreak havoc on the industry. As a result, ADWAR represents a modest contribution to our country.

Throughout the ADWAR development process, the developing team may encounter a number of obstacles; nevertheless, these obstacles will serve as excellent learning opportunities for the team. At the start of the short film, a search for animated films was conducted, but the findings were discouraging. In Bangladesh, we discovered a few animated flicks.

Among the most popular animated films in Bangladesh are Surviving 71, Meena, My Father Mujib, Tomorrow, Chilekothar Shepai - The Smoker, Chacha BahinirAjob Kahini, Murgi Keno Mutant, Detective, Moon Fairy, The Adventures of Montu Miah, The Truth, Shahana and Her Friends, Restoring Sight in Bangladesh, Madman Wonderland, Bodhirer Golpo, Falafel Sundays.

- 

1. **Surviving 71**

15 min | Animation, Short, War | **Filming**

Three captured freedom fighters of 1971 liberation war of Bangladesh, reminiscence about what brought them to the war as they prepare to face their ultimate demise, getting shot in the back and thrown out of a moving train.

Director: [Wahid Ibn Reza](#) | Stars: [Wahid Ibn Reza](#), [Jaya Ahsan](#), [Meher Afroz Shaon](#), [Tanzir Tuhin](#)
- 

2. **Meena (1991-)**

23 min | Animation, Short, Family

★ 8.3 ☆ [Rate this](#)

Meena tries to eradicate misconceptions and superstitions from the society and create social awareness about different social phenomenas with occasional help from a wide variety of characters including her parrot companion Mithu.

Stars: [Rajashree Nath](#), [Chetan Shashital](#), [Pinaki Mukherjee](#), [Kamal Jadhav](#)

Votes: 77
- 

3. **My Father Mujib (2021)**

49 min | Animation, Biography

★ 6.7 ☆ [Rate this](#)

The film portrays the childhood and political inception of the father of the nation of Bangladesh, Bangabandhu Sheikh Mujibur Rahman. The story-line apprises his outgrowth as the greatest Bengali of all time.

Director: [Sohel Mohammad Rana](#) | Stars: [Raju Ahmed](#), [Mohammad Rafique](#), [Mehbuba Mehnaz Bipa](#), [Tahsina Ferdous Rinia](#)

Votes: 12
- 

4. **Tomorrow (III) (2019)**

25 min | Animation, Short, Drama

★ 9.4 ☆ [Rate this](#)

Ratul has a vision shown by and old man in his sleep. He comes to know about the impacts of global warming.

Director: [Mohammad Shihab Uddin](#) | Stars: [Eashan Abdullah](#), [Raju Ahmed](#), [Mohammad Bari](#), [Tom Freeman](#)

Votes: 360

Figure 1.1: A list of animated films produced in Bangladesh (Part-1)

- 

5. Chilekothar Shepai - The Smoker (2021) +

4 min | Animation, Short

★ **9.2** ☆ [Rate this](#)

A silent animation about how smoking may prove detrimental to your life.

Director: [Ragib Mohmud Safayet Shah](#)

Votes: 81
- 

6. Chacha Bahinir Ajob Kahini (2018–) +

Animation

☆ [Rate this](#)

Chacha is ready to take your kids to a fascinating world of Bengali folklore, mythical creatures and breathtaking adventures. We are working on creating the first ever 3d animated series in... [See full summary »](#)

Stars: [Amirul Haque Chowdhury](#), [Intekhab Dinar](#), [Jayita Mahalanobish](#), [Rudra Anarja](#)
- 

7. Murgi Keno Mutant (2011) +

15 min | Animation, Short, Action

★ **8.0** ☆ [Rate this](#)

In the near future, Bangladesh is terrorized by killer mutant chickens. A team of kung-fu fighting chefs must hunt the killer chickens in order to keep chicken on their menu.

Director: [Nayeem Mahbub](#) | Stars: [Rakin Muttakillah](#), [Fahad Rehmani](#), [Shahana Siddiqui](#)

Votes: 200
- 

8. Detective +

126 min | Animation | **Completed**

Detective is an upcoming 2016 Bangladeshi 3D computer animated fantasy-Suspense film 3D Creations & Direction Tapan Ahmed produced by Jaaz Multimedia.The film is based on Rabindranath ... [See full summary »](#)

Director: [Tapan Ahmed](#) | Stars: [Arifin Shuvo](#), [Nusraat Faria Mazhar](#), [Eamin Haque Bobby](#), [Aliraj](#)

Figure 1.2: A list of animated films produced in Bangladesh (Part-2)



9. Moon Fairy (2009)

12 min | Animation, Short, Fantasy

★ [Rate this](#)

A moon fairy can grow wings only if someone praises her from heart. On a spooky Promptville night, it is hard to find people with civility of that kind.

Director: [Rezwan Shahriar Sumit](#) | Stars: [Tahseen Karim](#), [Sarita Rahman](#), [Rezwan Shahriar Sumit](#)





10. The Adventures of Montu Miah (2001–2007)

30 min | Animation, Action, Comedy

★ [Rate this](#)

The story is about Montu Miah, an ant who talks and moves like rural Bangladeshi people. He wears a lungi, a symbol of the rural people of Bangladesh. The protagonists and the villains on ... [See full summary »](#)





11. The Truth (IV) (2017)

2 min | Animation, Short, Fantasy | **Completed**

★ [Rate this](#)

A short film for the truth of any fiction Movies of the world.

Director: [Tirthok Ahsan Rubel](#)





12. Shahana and Her Friends (2015 TV Short)

15 min | Animation, Short

★ [Rate this](#)

UNFPA Bangladesh has made 6 tv films regarding `Stop child marriage` campaign in Bangladesh. Shahana is a lead character who will try to stop child marriage with the help of her few friends.

Director: [Mohammad Shihab Uddin](#)



Figure 1.3: A list of animated films produced in Bangladesh (Part-3)

- 

13. Restoring Sight in Bangladesh (2012 Video)

13 min | Documentary, Animation, Short

☆ [Rate this](#)

[Add a Plot](#)

Director: [Tatiana McCabe](#) | Star: [Tatiana McCabe](#)
- 

14. Madman Wonderland (2020)

9 min | Animation, Short

☆ [Rate this](#)

[Add a Plot](#)

Star: [Caitlin Romstedt](#)
- 

15. Bodhirer Golpo (2021)

Animation, Short

☆ [Rate this](#)

[Add a Plot](#)
- 

16. Falafel Sundays (2020 Video)

Animation, Short

☆ [Rate this](#)

[Add a Plot](#)

Directors: [Pracheta Ahana Alam](#), [Fahim Arif](#) | Star: [Max Mystal](#)

Figure 1.4: A list of animated films produced in Bangladesh (Part-4)



17. **Tumi Amar Jibon** (2012)

Animation, Short

★ 7.6 ☆ Rate this

[Add a Plot](#)

Director: [Zunayed Sabbir Ahmed](#) | Stars: [Zunayed Sabbir Ahmed](#), [Farzana Farha](#), [Farsim Hossain](#), [Shahd Khan](#)

Votes: 22





18. **Try** (2010)

Animation, Short

☆ Rate this

[Add a Plot](#)

Director: [Arifur Rahman](#)





19. **Magic Pipe** (2019 TV Short)

7 min | Documentary, Animation, Short | **Completed**

☆ Rate this

In the past there was lots of problem for rice cultivation and waste of water was so high. So Govt. of Bangladesh and other organization plan for this and was taken initial steps. In that ... [See full summary »](#)

Director: [Mohiuddin Mostafa](#)



Figure 1.5: A list of animated films produced in Bangladesh (Part-5)

1.2 Motivation

ADWAR reflects the development team's interests, passion, and hard work. The crew's constant objective is to create an animated short film that will be a science fiction film and a symbolic depiction of a specific experience in human existence.

The project's objective is self-evident. This initiative offers a new beginning for Bangladesh's animation industry, allowing it to enter and develop a position in the worldwide animation market. We are all aware of the global demand for animated films, as well as its size and proportion of the market.

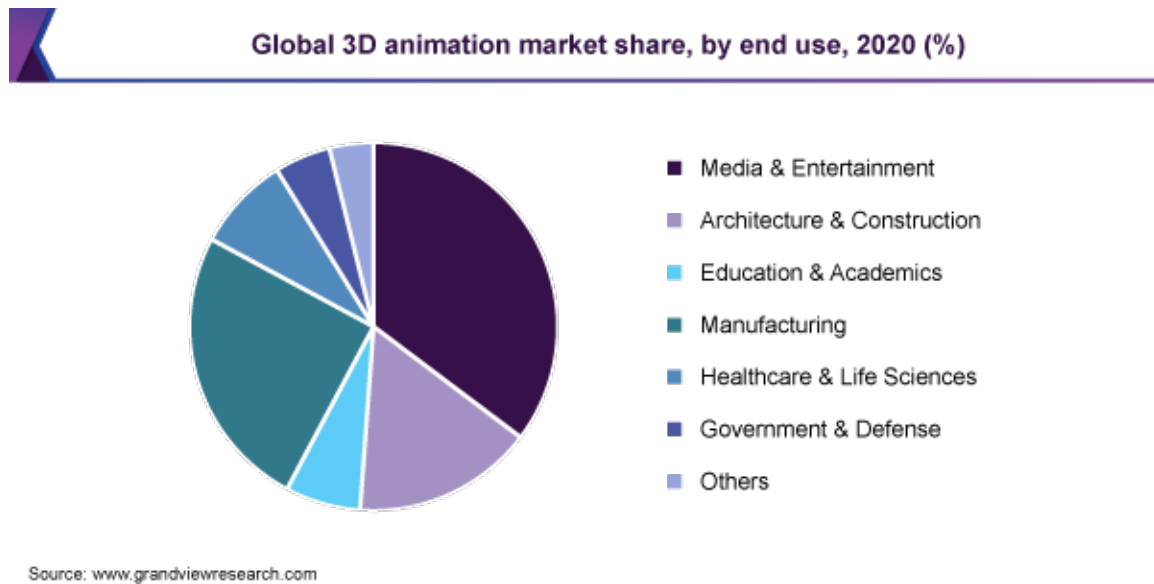


Figure 1.6: A chart depicting the global market share of 3D animation

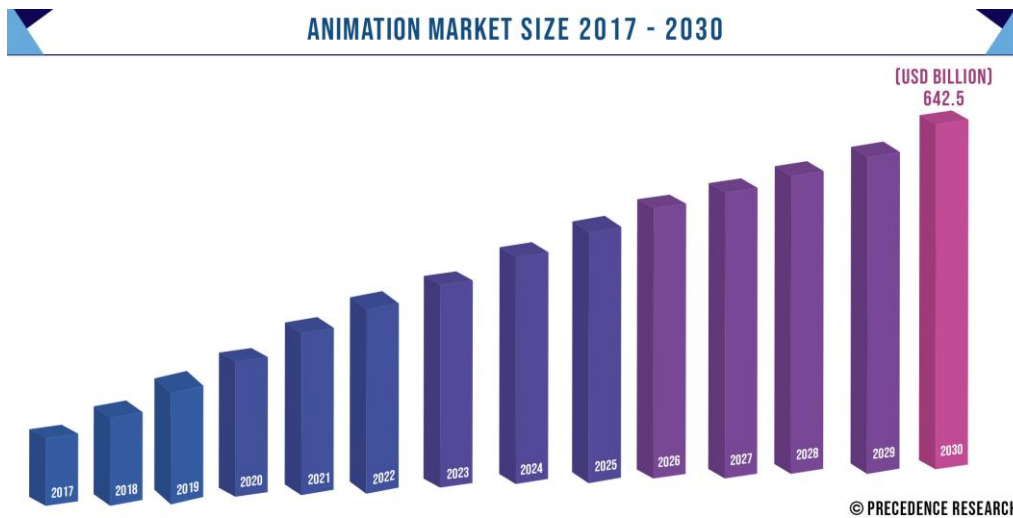
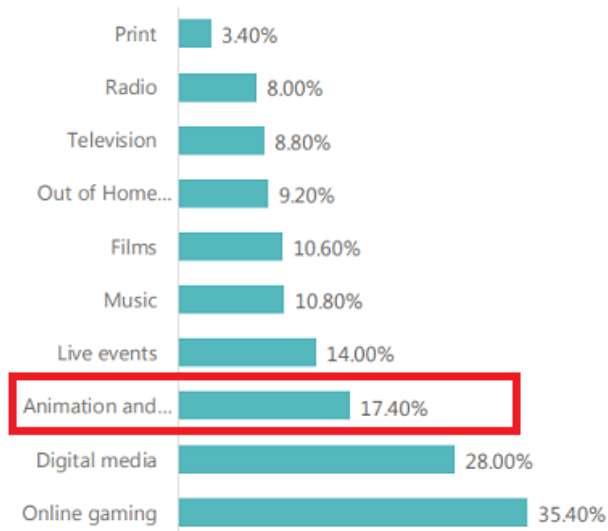


Figure 1.7: The scale of the worldwide animation market

**GROWTH RATE OF THE MEDIA AND ENTERTAINMENT SECTOR,
BY INDUSTRY**

in %, India, 2018-2021



Source: FICCI (Federation of Indian Chambers of Commerce & Industry)

Figure 1.8: Media and entertainment sector's growth rates

1.3 Objectives

The objective of the project is divided into two pieces.

- a. From a developmental viewpoint;
- b. From an audience standpoint.

From a developmental viewpoint

Bangladesh has a small number of animated films, and just two or three of them are of high quality. To ensure the quality of the animation output, the ADWAR development team adheres to industry best practices.

It should be obvious if we emphasis specific points.

- a. To contribute significantly to the animation film industry.
- c. Ensure the result is of a high standard of quality.
- b. Developing certain shortcuts for quickly generating high-quality work.
- d. Consolidating all stages of manufacturing in order to maintain a world-class industry standard.
- e. Producing a science-fictional 3D animation based on research.

From an audience standpoint

This short video is a metaphor for a certain emotion in a person's life. It will be a visual portrayal of life's movements that will assist viewers in relating to themselves in order to overcome despair and loneliness.

CHAPTER 2

PREVIOUS WORK

Despite the fact that Bangladesh has a small number of animated films, there are several instances worldwide. If a person passes the category test, he or she must state that ADWAR is a science fiction and space exploration short film.

WALL.E is an excellent example of a film comparable to ADWAR. WALL.E is somewhat longer than ADWAR due to the inclusion of a short film. WALL.E, on the other hand, was one of the most expensive films. ADWAR is collaboration between just two artists. When the budget and technical components are compared, there is a big discrepancy.

The development team noticed some similarities to a short film titled Planet Unknown. Additionally, there are certain differences to be noted. The entirety of ADWAR is a symbolic representation, whereas Planet Unknown is purely visual narrative. While the characters in these two films are similar in look and behavior, their activities, movement patterns, and appearances are not.

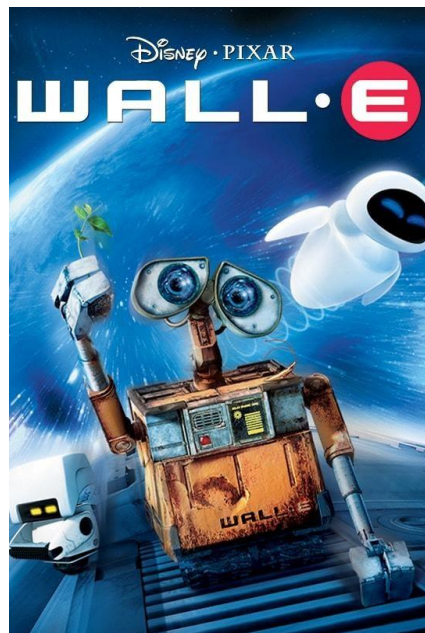


Figure 2.1: Poster of WALL·E (2008)



Figure 2.2: Synopsis of WALL-E



Credits:

Written & Directed by – Shawn Wang

Modelling, Texturing, Animation, Compositing & Editing –
Shawn Wang

Music & Sound Design by – Echoic Audio

Composer – Sam Foster

Sound Design by – Tom Gilbert & David Johnston

Special Thanks to – Evolutions

Re-recording Mixer – Will Norie

Faculty Producer – Xinyuan Huang

Faculty Adviser – Yucheng Huang

Special Thanks to System Advisers – Horizon Bian /

Sicong Wang / Jiawei Cao

Figure 2.3: Synopsis of Planet Unknown



Figure 2.4: Image from Planet Unknown short film

The ADWAR development team needed to be inspired by the concept art of several artists featured on ArtStation. Additionally, the development team examined many articles and blogs on the NASA website to obtain a better understanding of Mars' geography and other worlds' ecosystems.

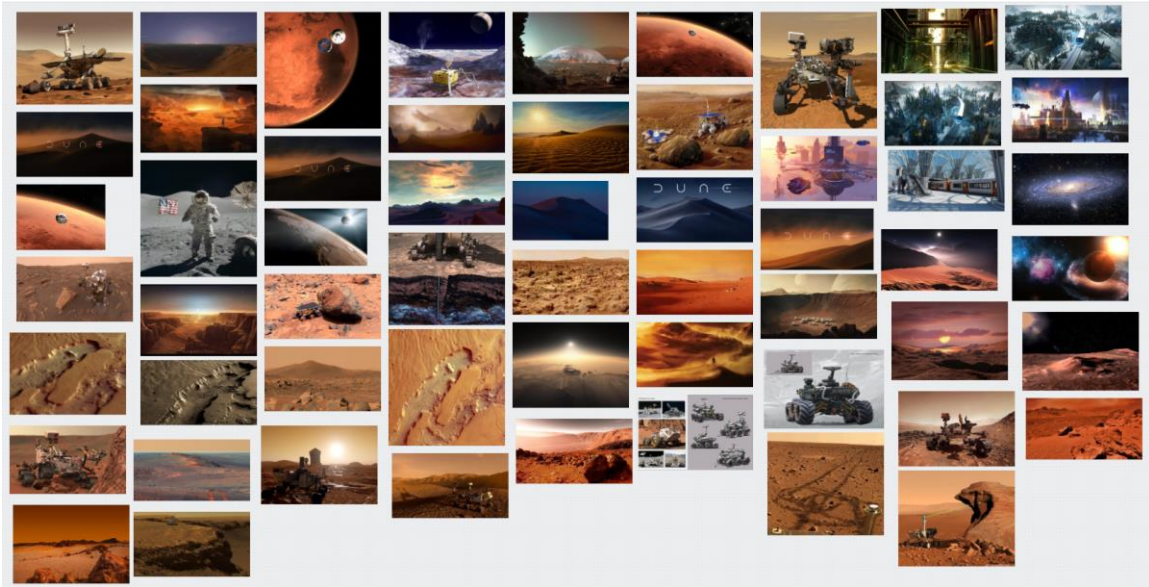


Figure 2.5: Milanote picture depiction



Figure 2.6: Mars image from NASA website

CHAPTER 3

USED SOFTWARE

Each piece of software is classified into one of three groups.

- a.** Production level software: Adobe After Effects, Adobe Photoshop, Adobe Illustrator, Autodesk Maya, World Creator, RizomUV, Houdini, Substance Painter, Autodesk Arnold, Adobe Media Encoder, Adobe Premier Pro, DaVinci Resolve, HandBrake
- b.** Project documentation software: Milanote, Microsoft Word, Microsoft Excel.
- c.** Project management software: Google Drive (Cloud Storage), XnConvert, Rclone, djv.

3.1 Production level software

According to the project's three production tiers, the software is separated into three stages.

- a.** Pre-production software: Adobe After Effects, Adobe Photoshop, Adobe Illustrator
- b.** Production software: Autodesk Maya, World Creator, RizomUV, Houdini, Substance Painter, Autodesk Arnold.
- c.** Post production software: Adobe After Effects, Adobe Media Encoder, Adobe Premier Pro, DaVinci Resolve, HandBreak



Figure 3.1: Logo of the used software

3.1.1 Autodesk Maya

Autodesk Maya is a robust 3D program with a layer-based keyframe animation system and a MASH Network System. Additionally, it has ray-trace lighting and rendering, an integrated Arnold renderer, and a bi-frost graph.

3.1.2 World Creator

World Creator is a piece of software created by BiteTheByte, a German firm specializing in real-time landscape and terrain construction, generation, and visualization. It is a procedural program that makes use of non-disruptive workflow, which has become the industry standard for digital content creation and other industries. It supports and interfaces with over 25+ apps, and nearly every major film, visual effect, and game company relies on World Creator's versatility and smooth integration.

3.1.3 RizomUV

This application never ceases to amaze me. Due to the application's history. There are numerous independent programs and plugins available on the internet today. However, the creator of this program is the same as the creator of "Unfold3D," which is used by all Autodesk applications, including Maya, Softimage, Mudbox, and 3ds Max. Remi Arquier created another excellent tool in 2016, which has since dominated the UV unwrapping pipeline. Remi Arquier, on the other hand, did not join Autodesk this time but went alone. Rizom UV is a robust and self-contained application for unwrapping 3D models in both real and virtual space. It has several intriguing tools for folding, unfolding, relaxing, arranging, layout, distributing, selecting, and aligning, among other things. Additionally, the easy interaction with Maya is a benefit.

3.1.4 Houdini

Houdini is a computer-generated imagery application developed by SideFX, a Toronto-based startup. It is a modification of the PRISMS software suite, which is also a procedural generation tool. Houdini is modeling, rigging, animation, simulation, visual effects, rendering, and compositing application. However, Houdini is the industry standard for visual effects in the computer graphics business. It is an indispensable program for all visual effect's studios, including Walt Disney, Pixar, DreamWorks, ILM, MPC, Sony, and Method Studio.

3.1.5 Substance Painter

Allegorithmic, a French software company, developed Substance Painter, a tool for producing procedural textures. After Adobe acquired Allegorithmic in January 2019, the program was renamed "Adobe Substance Painter." Another significant software company, Adobe, offers the Total Creative Suite, which is a collection of multimedia and creative applications.

3.1.6 Autodesk Arnold

Maya's default rendering engine is Arnold. Solid Angle, a business based in Spain, designed it. However, the creator later agreed to work with Autodesk on the development of this great product, and Autodesk has since purchased Solid Angle. Arnold is a CPU-based renderer that recently added limited Nvidia GPU support. Arnold Renderer has also appeared in a number of high-profile films, including Captain America: The Winter Soldier, Thor, Star Wars, Game of Thrones, and Elysium.

CHAPTER 4

METHOD OF DEVELOPMENT

4.0 Production Stages

To ensure the long-term viability of our project, we followed an industry-standard production line to ensure ADWAR's maximum output.

Pre-production

Gathering References and Idea

Story Creation

Sound Design

Writing on Voice over

Story Board and animatic

Production

Creating asset and model

Character design and model

Creating environment

Character rig and animation

Camera animation

Simulation and VFX

Lighting and LookDev

Scene Optimization

Rendering

Post-production

Recording Voice over

Compositing and Editing

Color Grading



Figure 4.1: Our Pipeline

We also maintained a gantt chart in accordance with our team's strategy to ensure that our project was completed on schedule.

ADWAR (3D Short Film) Time-schedule

Monowar Kayser Moon (181-40-509)
Tonmoy Baroi (181-40-464)

Project Start to End: 9/1/2021 to 1/5/22

TASK	ASSIGNED TO	PROGRESS	START	END	ETA
Pre-production					
Gathering References and Idea	Both	100%	9/1/2021 to 1/5/22	9/14/21	
Story Creation	Both	100%	9/7/21	9/21/21	
Sound Design	Moon	100%	9/25/21	10/10/21	
Writing on Voice over	Moon	...	...	...	TBA
Story Board and animatics	Both	100%	9/25/21	10/12/21	
Production					
Creatingt asset and model	Both	100%	10/12/21	10/31/21	
Character design and model	Both	100%	10/15/21	10/31/21	
Creating environment	Tonmoy	100%	10/21/21	11/2/21	
Character rig and animation	Both	100%	11/12/21	12/7/21	
Camera animation	Moon	100%	11/12/21	12/10/21	
Simulation and VFX	Both	100%	11/15/21	12/18/21	
Lighting And LookDev	Both	100%	11/2/21	11/12/21	
Scene Optimization	Tonmoy	100%	12/15/21	12/25/21	
Rendering	Both	100%	12/8/21	1/2/22	
Post-production					
Recording Voice over	Moon	...	...	...	TBA
Compositing and Editing	Both	100%	1/2/22	1/5/22	
Color Grading	Moon	100%	1/5/22	1/5/22	

Figure 4.2: Timetable for the project

4.1 Pre-Production

4.1.1 Gathering References and Idea

It has always been a goal of ours to create a science fiction short film. We began watching science fiction films in our youth, so the word was not unfamiliar to us. However, in terms of development and research, we needed to work on it extensively. We visited the ArtStation and NASA websites, as well as a few other odd sites related to space and rovers. We wanted to create something unique, so we began writing our narrative and completed it in one month, as planned. We attempted to depict our tale in a symbolic video.

4.1.2 Story Creation

We intended to develop a figure who would symbolize human existence, but he would be isolated in a location. He will meet someone and they will become buddies one day. The protagonist's loneliness will fade. However, a calamity strikes and he is forced to return to his prior life. However, he will continue on and discover something new, which is the magic of life and what it teaches us.

4.1.3 Sound Design

Sound design was important for us because we made an animation of two inanimate objects. We had to express their emotions with sounds. We even made a mood board for sounds that enabled us to perform pre-visualization before generating the short video, as it helped us to get into the right mindset for the mood and the feeling we were after. We licensed our music through Epidemic Sound (an online marketplace for stock sound effects).

4.1.4 Writing on Voice over

We meant to create a voice-over for the story but changed our thoughts, so we omit this section.

4.1.5 Story Board

The narrative image sequence was created using Adobe Photoshop and Illustrator. These two applications are considered industry standards for drawing and vectorizing images. The bulk of the drawings were done digitally in Photoshop and Illustrator, with the exception of a few that were created by hand.

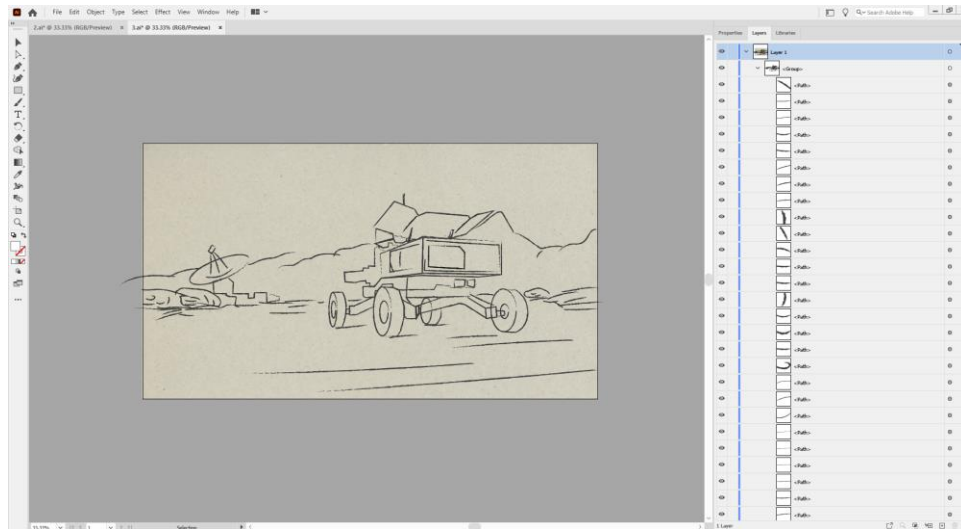


Figure 4.3: Creating a narrative illustration in Illustrator

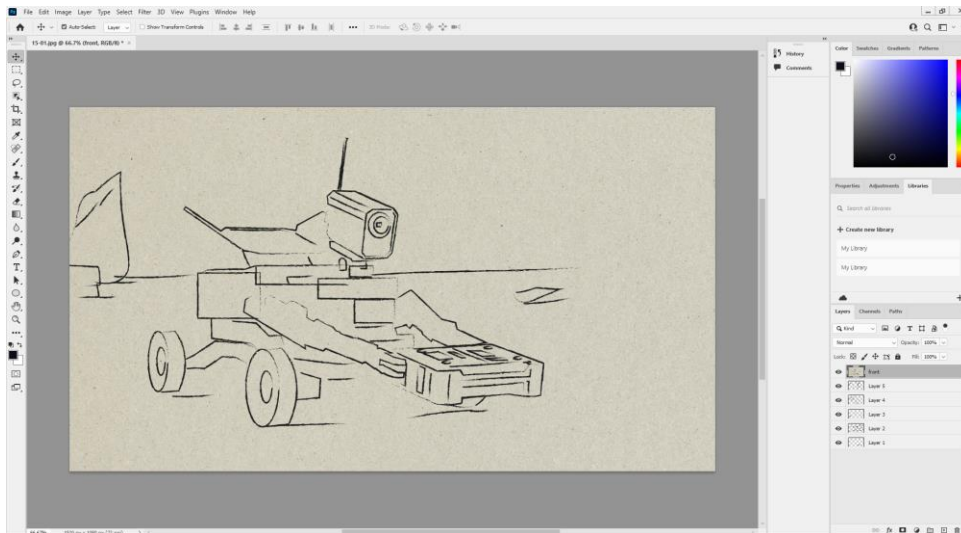


Figure 4.4: Illustration for the storyboard in Photoshop



Figure 4.5: Storyboard (Part-1)
Beginning shot



Figure 4.6: Storyboard (Part-2)
Exploring the Planet



Figure 4.7: Storyboard (Part-3)
Testing soil and reporting to the base

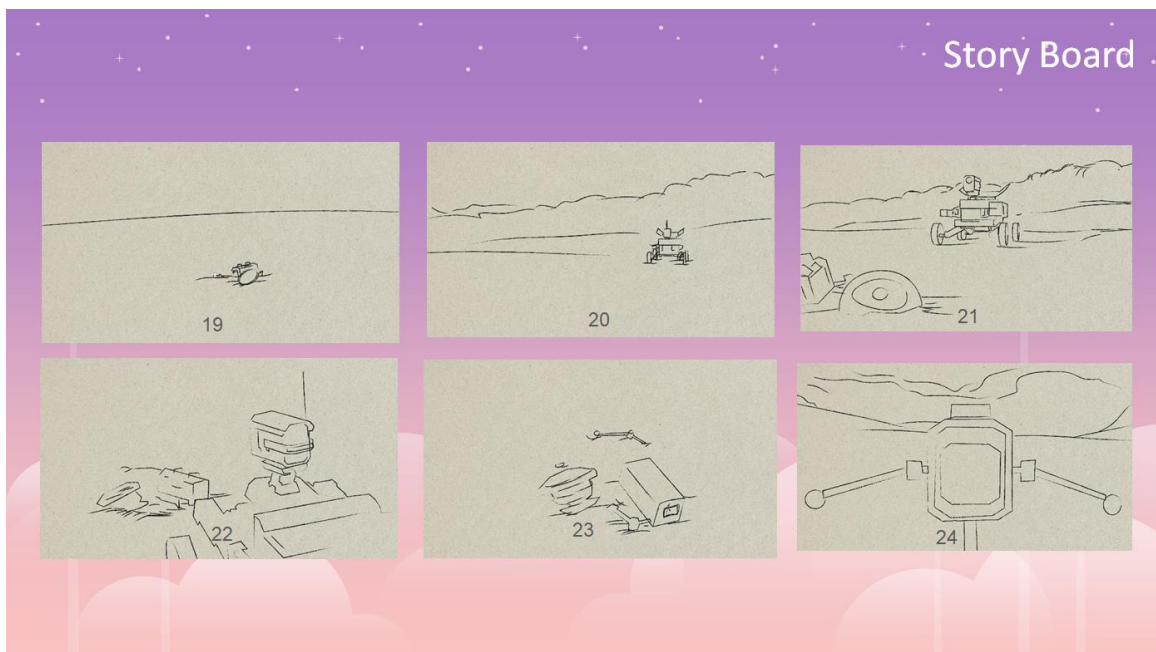


Figure 4.8: Storyboard (Part-4)
Found something in a desert



Figure 4.9: Storyboard (Part-5)
Deep exploration in the planet with CK-32



Figure 4.10: Storyboard (Part-6)
Sudden disaster



Figure 4.11: Storyboard (Part-7)
Discovered something unbelievable

4.1.6 Adobe After Effects for creating the Animatic

Adobe After Effects was used to create the pre-visualization for ADWAR. Following the completion of the sound design, the drawings were imported into Adobe After Effects and integrated with the audio.



Figure 4.12: Animatic in Adobe After Effects

4.2 Production

4.2.1 Creating asset model and character

We used Autodesk Maya to develop components, models, and characters. Due to the fact that the film has two characters named ADWAR and CK-32, we spent more time modeling ADWAR and CK-32 than we did other models. Despite the apparent significance of the features, the modeling procedure was uncomplicated. Extrude and bevel were often used commands to bring the modeling process to a close.

4.2.2 Creating environment

There are numerous landscape design and terrain creation programs available. for example, World Generator, VUE Extreme, and Terragen. However, we selected WC due to its robust procedural workflow and seamless interface with any DCC, in our case Maya and Houdini. World Creator may generate float 32-bit output for many maps. WC has the ability to export our landscape as a float 32bit height map or as a high-poly geo mesh. This enables us to observe and edit our surroundings in real time, thanks to a built-in real-time renderer that can utilize both the CPU and GPU. Due to the fact that it consumes nearly all available system resources, we occasionally experience lagging as well. However, when taken with a grain of salt, WC can create an excellent landscape.

4.2.3 UV Mapping

For better texture, UV mapping is essential. We sometimes omit this step, but if UV isn't properly unfolded, it might cause problems. Any type of texture basis shading or PBR shading is not possible. Multi-UDIM tiling is supported in Maya. Multi UDIM tiling comes extremely handy when working on large, complex models that demand a lot of Texal density.

4.2.4 Texturing

Two industry-standard apps are now available. Foundry's Mari is a product, and Foundry's Substance Painter is a product they developed. Both of them are capable of developing and shading our model. Substance Painter, on the other hand, was chosen because of its close integration with Maya, Houdini, and other DCC products.

Substance Painter is a layering application using a texture-based approach. It's a simple and easy-to-use tool for texturing models and other three-dimensional objects. It uses both OpenGL and the Ray Tracing Renderer, called "IRay," to create a real-time viewing experience. OpenGL, on the other hand, is much faster than Iray. It does, however, enable for bespoke or third-party renderer engines if desired.

Substance would allow MultiUDIM if we wanted it (Mari workflow). Because of the higher Texel Density, we were obliged to use MultiUDIM UV. At least five UDIM tiles are present in the geometries of both of our robots. We'll utilize the Substance Painter function to tone this model. Substance Painter can currently produce textures with a resolution of up to 8K. All of our texture files are also available in two resolutions: 1K and 4K. To speed up the rendering process, we used a 1K texture in our project.

4.2.5 Rigging

We didn't have any human characters or personalities, which raises the question, "Why do we need rigging?" As a result, even if we don't have any human protagonists, our story will be carried on by robots/droids. Auto can also be used to identify this Droid. These are items that, like Human Figure Auto, should not be animated without a suitable rig. We needed to correctly rig our droid figure for effective animation because there are various sophisticated and interconnected components that contribute to the movement of autos. We make use of the features that come with Maya 2022. Nurbs/Curves is the controller.

Mesh control with automatic Orientation, Rotation, and Direction Constraints, "Maya," and "Deform." Finally, for more advanced rigging, Mel Expression (a Maya programming language) is accessible. Our model was rigged in a way that allowed it to be resized without causing the mesh or rig to break. Our gear has a feature that allows us to alter the speed. In response to bodily movement, it will automate the spinning of the wheel.

4.2.6 Animation

We imported and tested the rigged characters prior to animation. The two characters were animated in line with the storyboard. This work was done through the use of keyframe animation. Additionally, multiple reference videos were used to precisely show the rovers' movement in the animation.



Figure 4.13: Rover's falling video

4.2.7 Volumetric Simulation

Our Short Film contains a sequence in which our Droid character encounters difficulties due to a large storm. We require a volumetric simulation for that scenario, but it is very impossible to produce with Maya. We migrated to SideFX Houdini from Maya since the Maya volume tool is not standard or procedural.

We are seeking for a volumetric simulation. And Houdini has the most effective solver for this, which is called "Pyro." Pyro is a solution that is capable to readily handling volumetric simulation. Due to the procedural aspect of this software, it has become significantly easier for us to conduct study, test, practice, and retrace our steps.

4.2.8 Lighting

3D Lighting is an important part in the 3D or VFX pipeline. A proper lighting is essential for better render outcome. We used only Hdri lighting and Directional Lighting in our scene because all of our storyline refers to the outdoor environment.

4.2.9 Scene Optimization

Initially every scene file in our project became larger in size with the higher poly count. But with the use of Houdini, we reduced our Geometry file up to 60%. If we did not optimize our scene file enough Rendering those scenes would be much harder than it already is.

4.2.10 Lookdev

Before rendering we had to ensure our scene quality and consistency throughout the story line. We can't just lookdev and render out shots one by one without proper lookdev or visual development. In lookdev process we had to correct color, light intensity, Reflection, Reflection, Ambient Occlusion, Normal Value and so many other scenes.

4.2.11 Rendering

Rendering is the process of using the CPU or GPU to create photorealistic or non-photorealistic images of a 3D object or scene. Rendering is the end result of a 3D/CG/VFX pipeline that includes Geometry Mesh, Particles, Volume, ViewPlane, Texture, Light, and Shading Data.

Our major rendering engine is Arnold Renderer. With certain limitations, GPU rendering is now supported in recent versions of Arnold. As a result, we chose Arnold with GPU rendering. We didn't use the GUI version of Arnold to keep our workflow smooth and efficient. To render scenes, we leverage Arnold's command line functionality.

4.3. Post-Production

4.3.1 Compositing and Editing

Individual EXR files including numerous utility passes were used to create our renderings. Adobe After Effects was used to compose the music for this short film. We used the ACES workflow for color management. We had to use an After Effects plugin that supports OCIO because the ACES workflow isn't natively included into the software. OCIO, also known as Open Color IO, was created by Sony Pictures ImageWorks, a Hollywood visual effects studio.

The video was edited with Adobe Premiere Pro. To begin, we sequenced the After Effects footage that had been exported. The cuts and transitions were guided by the storyboard. The timeline of the footage was also remapped using Premiere Pro. The title animation and bottom thirds were also created in Premiere Pro.

4.3.2 Color Grading

For color grading, we utilized Da Vinci Resolve. When it comes to color grading, Da Vinci Resolve is unmatched. Nowadays, all Hollywood films utilize Resolve for color grading. Due to its incredible capabilities, it has become the industry standard. As a result, we wanted to give our short video our all and employed Da Vinci Resolve. The results are incredible, and we are quite delighted to have achieved them.

We created a mood board in which we gathered all the reference photographs we could find online, both genuine images from NASA and beautiful images created by other aspiring artists on the Art Station, which served as inspiration for our color grading. Our color palette is predominantly comparable and complimentary, which is quite esthetically pleasing.

CHAPTER 5

CONTRIBUTION

A big project like this needs manpower but we are a Team of two. That's why we try to divide our work as efficiently as we can. And thankfully my Teammate is flexible enough to keep up with it. To manage and keep track of our progress I create an excel sheet and we continue to follow each other's progress and complete our Pipeline step by step. As a member of this Team of two, the responsibility i had is,

- Modeling
- UV & Shading
- Rigging
- Environment Design
- Simulation
- Lighting
- Lookdev/ Visual Development
- Project Management

5.1 Modeling

At first, we did many meet sessions to discuss our project and came up with many different ideas. We collected many different reference images, the study analyzed Machine anatomy to figure out how our model should be, which type of feature it should have. After much discussion and research, we came up with some references and ideas and began our modeling.

5.1.1 Preparation

I created a Project Folder with the necessary folder, to begin with. So that all of our files, resources, data, cache files are stored separately and precisely. Because a perfect Project Structure is very important and crucial in a Large Project like this. A single file loss can break our complete workflow.

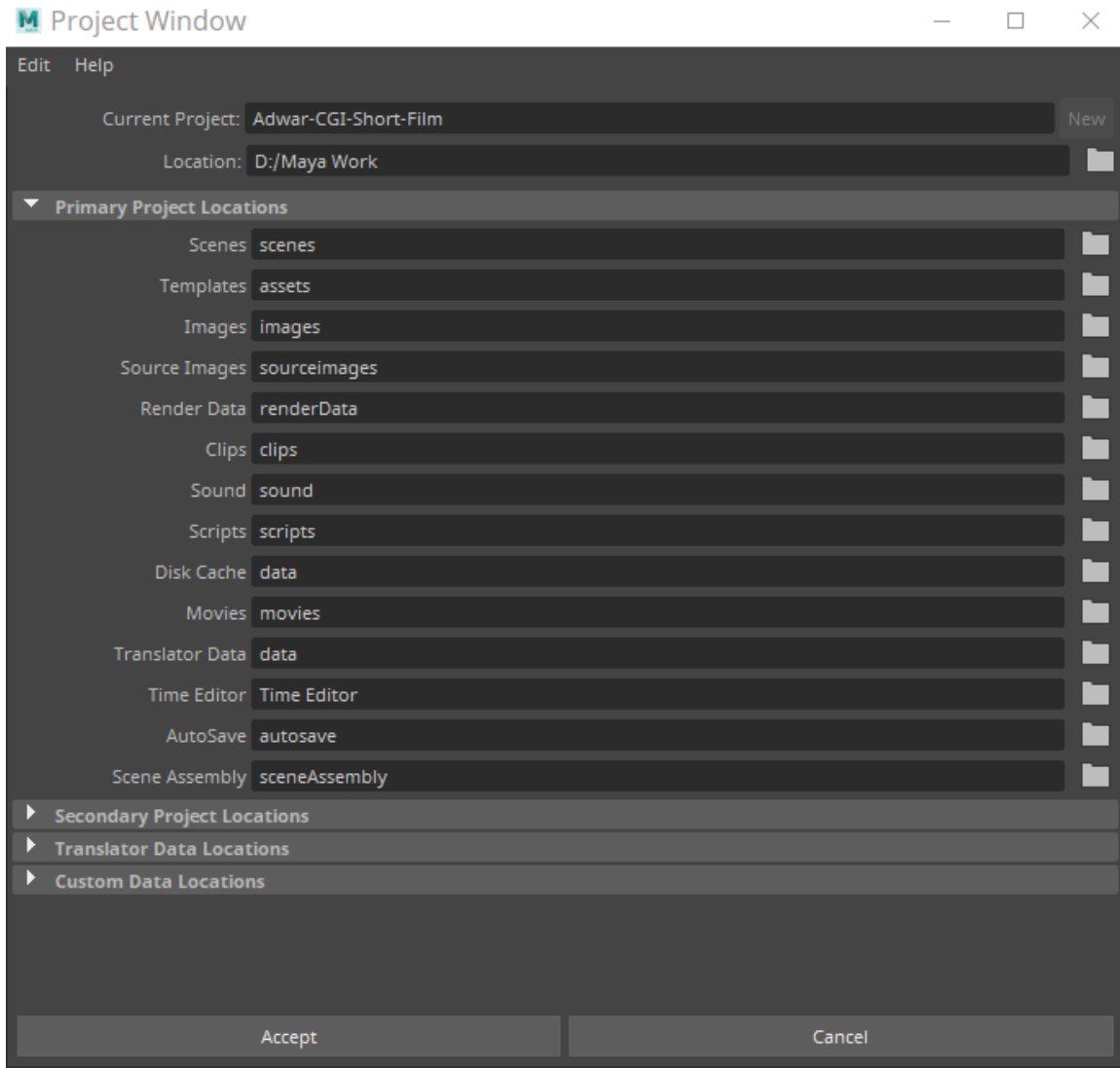


Figure 5.1: Creating & Setting Project File

5.1.2 Color Management

I made sure the color space of our project stayed consistent throughout the pipeline. I chose ACES as our main Color Space for our project. ACES means Academy Color Encoding System developed by Academy of Motion Picture Arts and Sciences. ACES has a total of 5 Different Color-Space Definitions for all of its work. They are,

- ACES2065-1
- ACEScc
- ACEScct
- ACEScg
- ACESproxy

There is significance difference between traditional sRGB and ACES color space.

ACEScg, sRGB CIE 1931 2 Degree Standard Observer - CIE 1931 Chromaticity Diagram

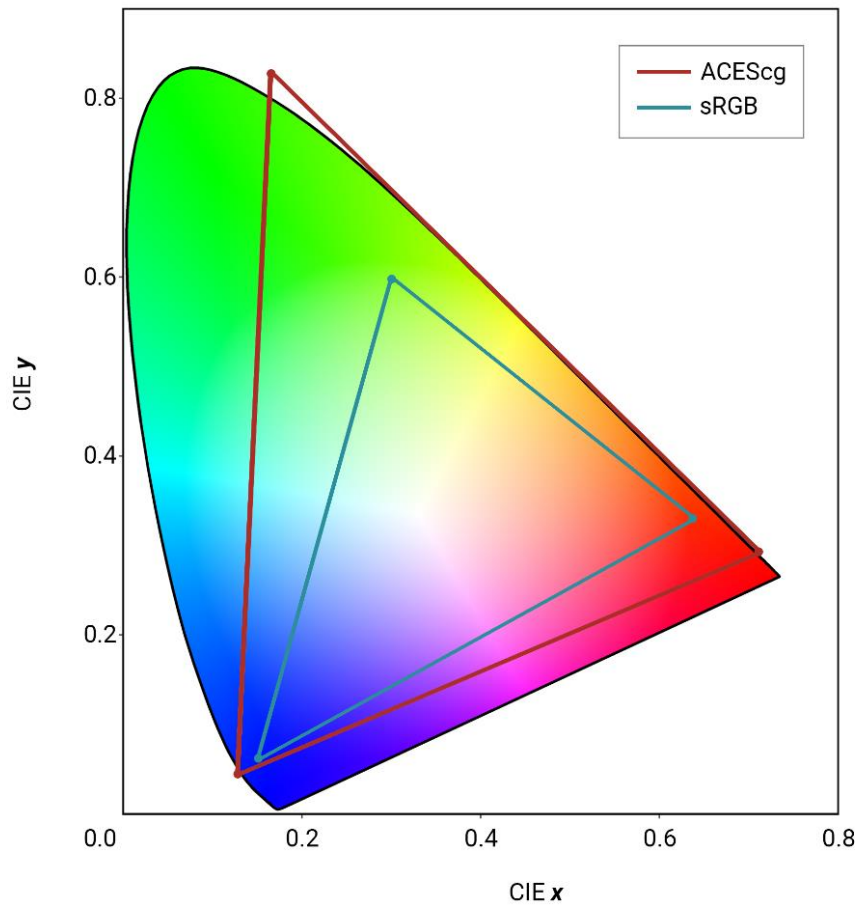


Figure 5.2: sRGB vs ACEScg Color space

In our workflow we used ACEScg which uses AP1 wide-gamut same as other variations but mostly suitable for CG related content.

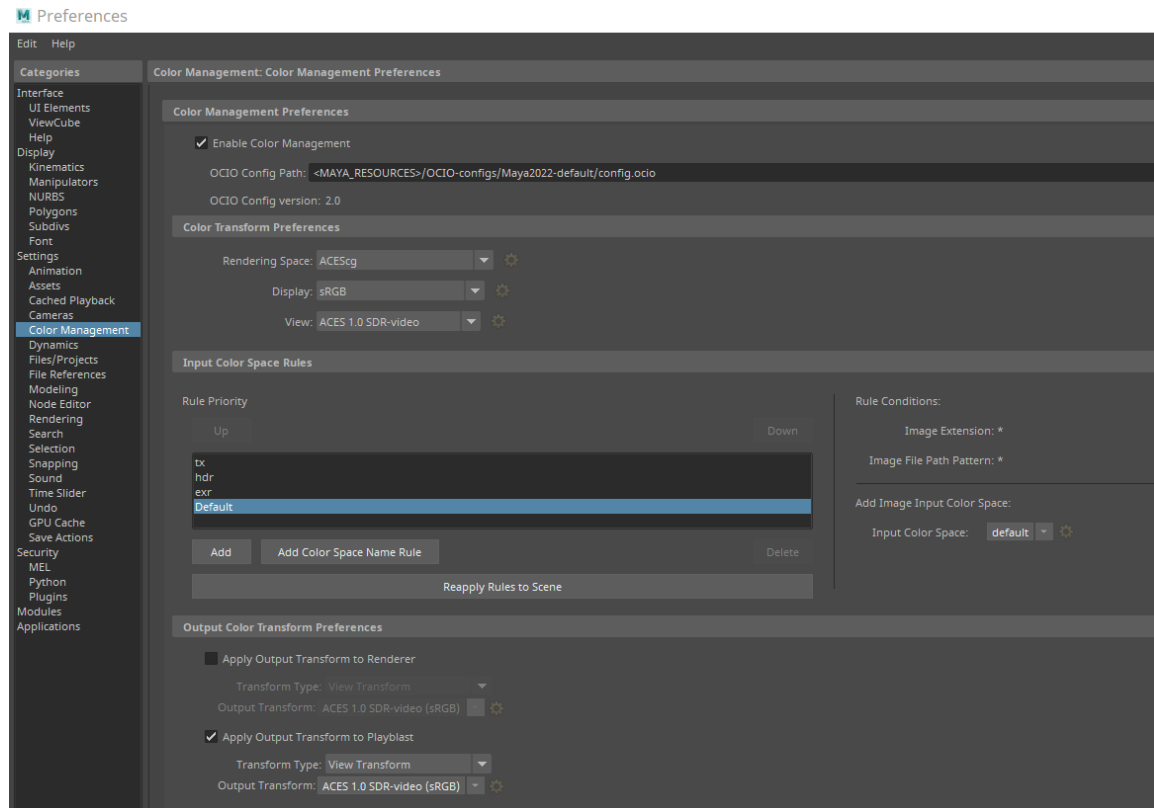


Figure 5.3: ACEScg Settings in Maya

5.1.3 IDT and ODT for ACES Color Space

Our ODT is a fixed one which is ACEScg. But for different types of images, we had to use different types of IDT Profile in our color space. I always used the IDT according to the file specification. So, this sample structure is not fixed. It may need to change if the original file comes with a different color space.

Diffuse Map (png, jpg, tiff)	sRGB
Roughness, Metallic, Height, AO (png, jpg)	sRGB
Roughness, Metallic, Height, AO (exr, trg)	scene-linear-sRGB, RAW
HDRI from HdriHeaven	scene-linear-sRGB
HDRI (exr)	scene-linear-sRGB

5.1.4 Modeling ADWAR

After much preparation, I started Modeling our first Character (Adwar). I use Maya modeling tools to model this. I didn't use any Third-party tools or Plugins for modeling to Make our project more compatible for post-upgrade.

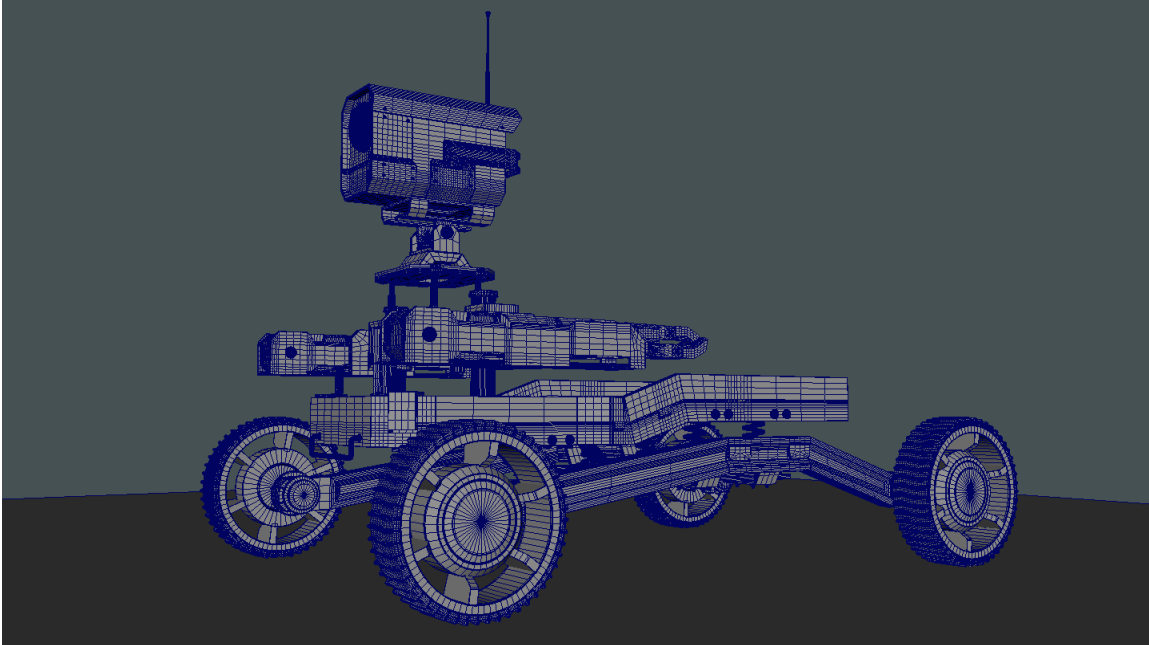


Figure 5.4: Modeling Adware Character in Maya

5.1.5 Model Optimization

High-Poly Geo is kind of better for CG Film and VFX but to Avoid Extra Render time and Complexity in Scene I optimized my Model As far as i Could.

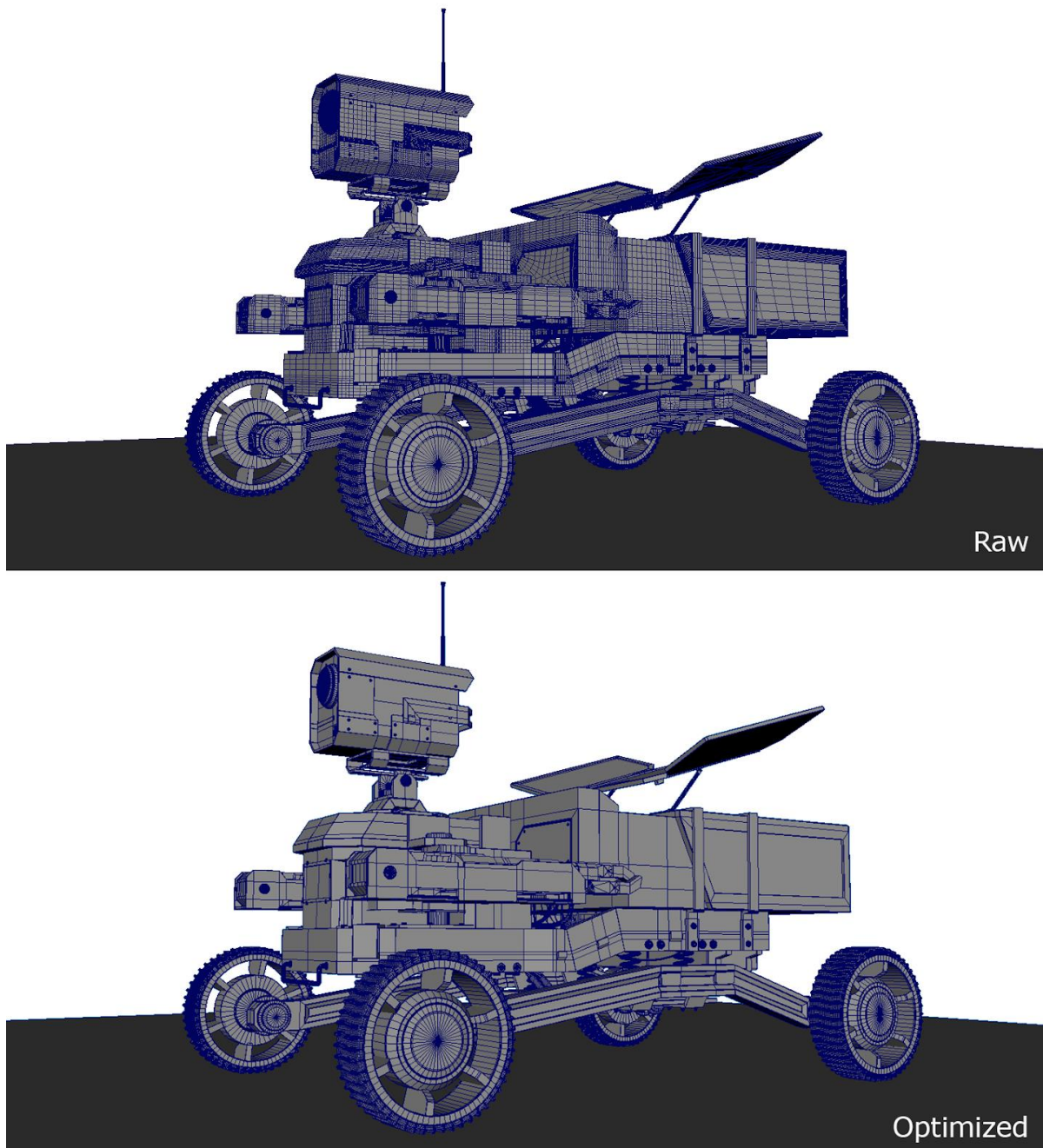


Figure 5.5: Model Optimization

5.2 UV and Shading

I did these two tasks on two completely different Applications. So, at first, I made a few new adjustments and gave a proper naming scheme for my file structure so that any exported and modified files can interact with each other. This way Future adjustments will apply automatically.

5.2.1 UV Unwrapping and Layout

Export my Model from Maya to Rizom UV using Bridge and Make the proper cut and Unfold using Rizom Build-In Tools. Then Flatten out UV on UV Grid. And lastly Export the whole Model back to Maya with the same process.

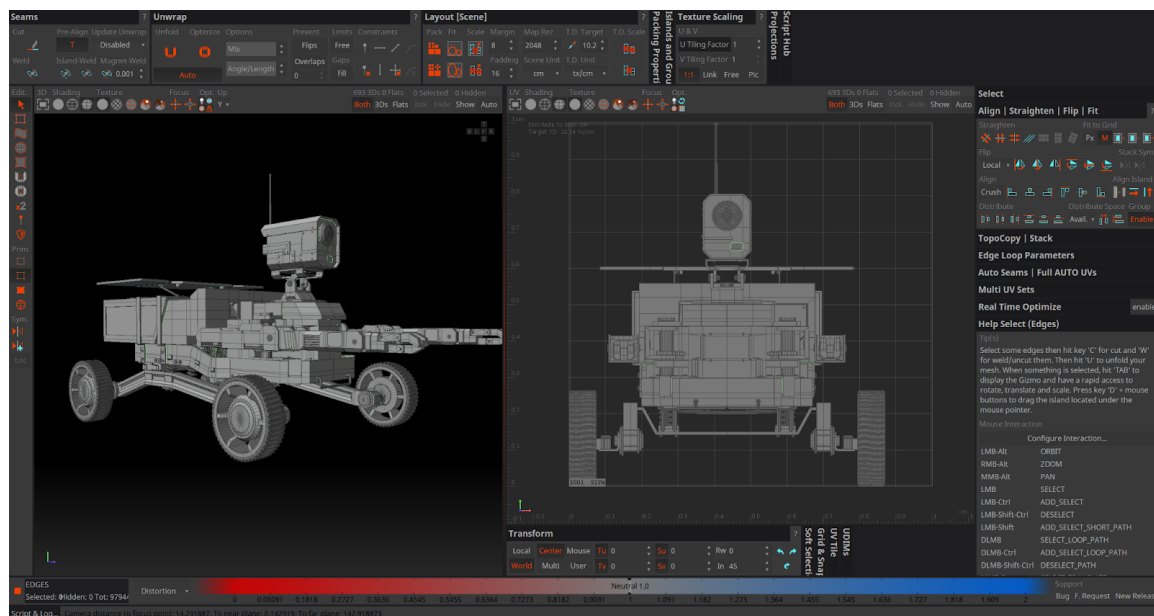


Figure 5.6: UV Unwrapping in RizomUV

For maintain even and equal texture density throughout our pipeline, I create multiple UV tiles so called MultiUDIM for each and every object.

5.2.2 Choosing between Correct PBR Shader

Our project has 2 main different types of shading. One is Reflective and the Other is non-Reflective which is Ground and Rocks. That's why I decided to go with Metallic-Roughness PBR Workflow. And Substance Painter is best for both Metallic-Roughness and Specular-Glossiness workflow.

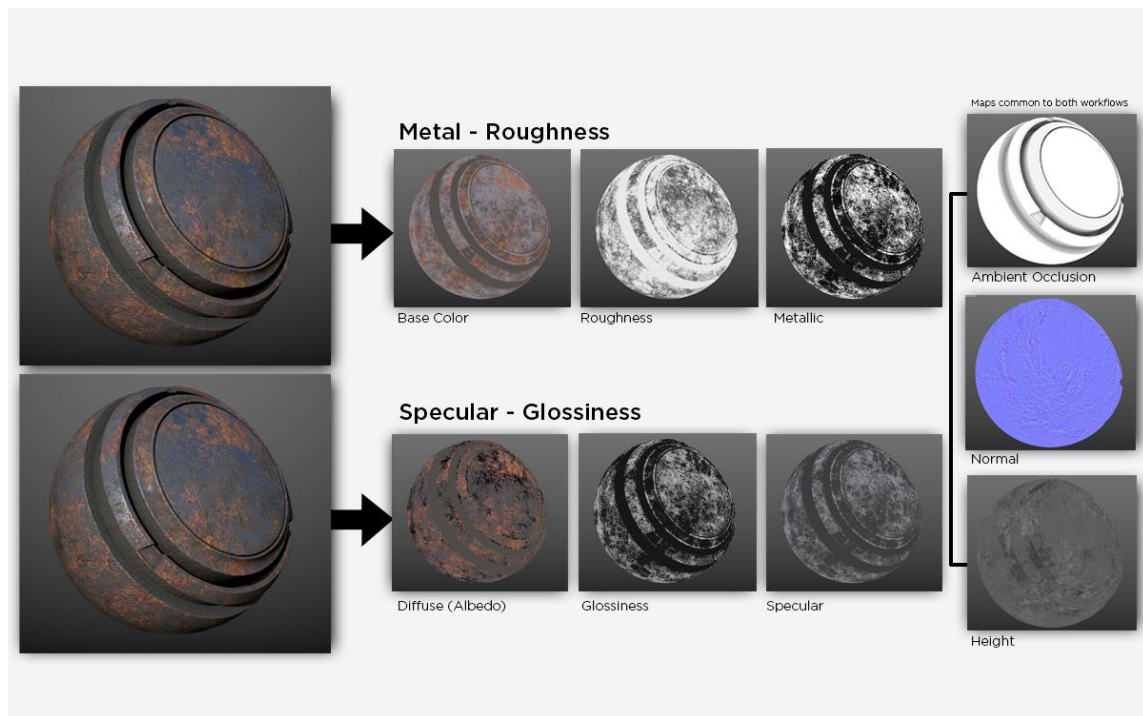


Figure 5.7: Metal-Roughness VS Specular-Glossiness

5.2.3 Preparation for Shading

Because all of our models are packed with many Geos, I wanted to use Multi UDIM to texturing our Model. After that I Place my Model on a flat ground without any ground plane to avoid any unnecessary AO conflict.

5.2.4 Baking Maps in Substance Painter

After importing the Model in Substance Painter, I baked all the maps in the application built-in map generation with curvature and normal maps. Because these two maps are important for Metallic Object shading.

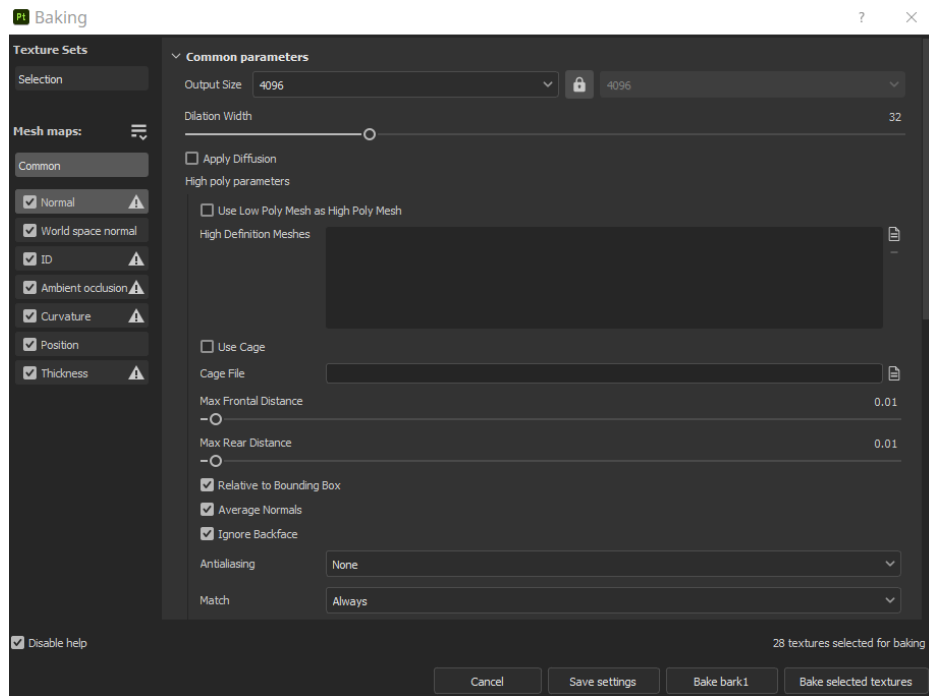


Figure 5.8: Baking Process in Painter

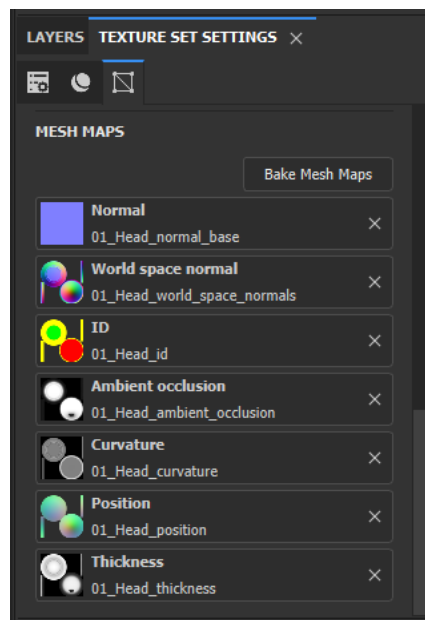


Figure 5.9: Baked Maps

5.3 Rigging

Mechanic Rigging is as hard as rigging a human character. Because we had to consider many mechanical movements, rotation, orientation, and no scaling factor.

5.3.1 Analyzing Model

Before starting rigging our character I analyzed how our character should behave and which type of movement it should have, what type of Extra feature I want for this character. After some research I decided to rig up my character with 3 different stages.

3 Stages are,

- Primary Rig (Rover Movement and Orientation)
- Secondary Rig (Body and Hand Movement and Feature)
- Tertiary Rig (Facial Rig and Feature)

5.3.2 Primary Rig

I did this part with Mel Expression. Because it's more efficient and effective. Some of the mel expressions are given below.

“

Expression Example:

```
Rover_GL_Control|Left_Front_Base|Left_Front_Slide|Left_Front_Rotator|Left_Front_Wheel.rotateX    =  
Rover_GL_Control.translateZ * Rover_GL_Control.RoverSpeed;  
Rover_GL_Control|Rover_Base_Geo|Upper_Body_Control|Top_Base_Structure|Rover_Body_Control|CP  
U_Power_Control|CPU_Main|CPU_Cover.translateZ                                           =  
Rover_GL_Control|Rover_Base_Geo|Upper_Body_Control|Top_Base_Structure|Rover_Body_Control|CP  
U_Power_Control.cpuCover * 0.72;
```

”

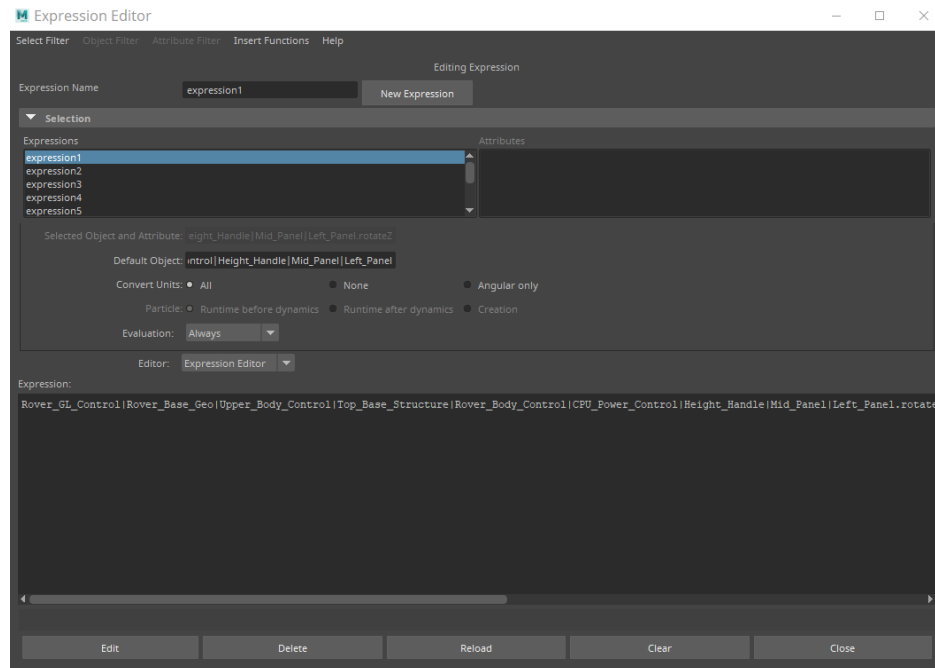


Figure 5.12: Mel Expression on Editor

5.3.3 Secondary and Tertiary Rig

I mixed Mel expression and constraint and Driver/Driven attribute to accomplish these rigging stages.

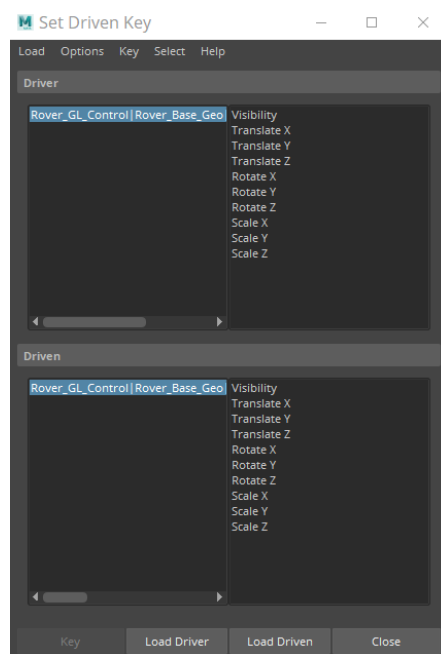


Figure 5.13: Driver/Driven Setup for Adwar

5.4 Environment Design

Our project is a Sci-Fi Short film. It's about an AI powered Droid on an unknown planet on a mission. So basically, our environment design should be as per our story. In 3D pipeline this task is assigned to an Environment Artist or group of Environment Artist. Because crafting an Environment isn't easy job. For this I need to Analyzed and Understand the basis of topology, architecture, cityscape, landscape and geography of a Specific Environment.

Scaling is a big issue for Environment. Then comes material and Shading network building, and finally supplementary asset for Environment. Environment took almost 80% to 90% of screen space. That's why we use standard method and tool to crafting Environment.

5.4.1 Collecting Reference

Collecting references is important for environment design or level design. I collected some of the images from the Art Station and NASA website for reference and basic ideas about the color scheme on Planet MARS and a few others.



Figure 5.14: Environment Reference - 1

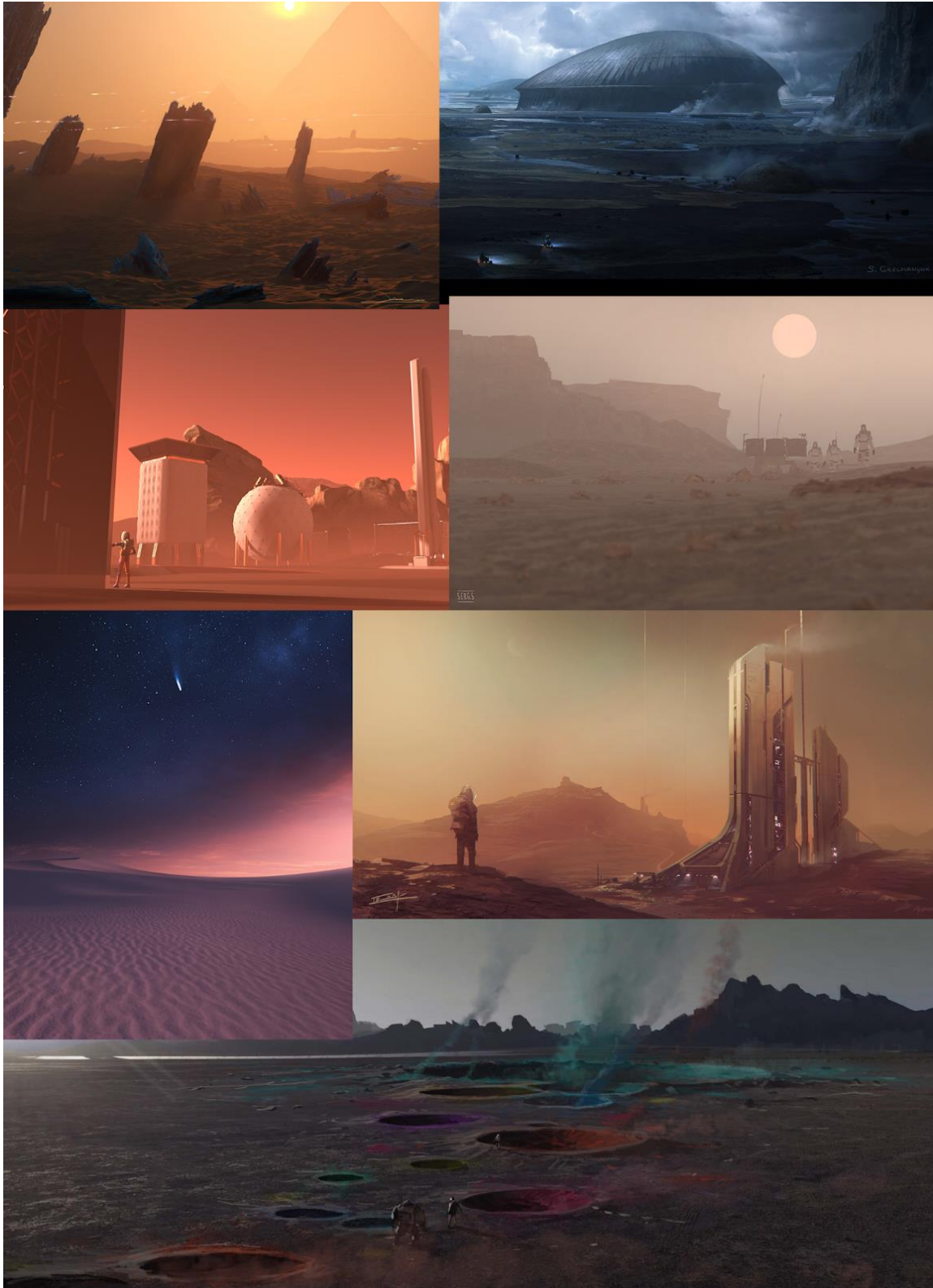


Figure 5.15: Environment Reference - 2

5.4.2 Prepare for WorldCreator

World Creator is a Powerful Procedural application for creating Environment and Generate Terrain. It can export terrain both as a map and as an object file. And I am going to use the object version because of poor heightmap support in Maya. But I also need other maps such as Albedo maps, Splat maps, Roughness maps, AO maps etc. Creating our desired terrain at one chance is not easy so we may need some iteration for reaching our final output of it so I made a specific folder and naming scheme for my World Creator project for seamless file linking.

5.4.3 Generating Terrain and Shading

After Project setup I create 8 different variance of Environment for our Full storyline and shading it according to mood, weather and Day/Night scene.

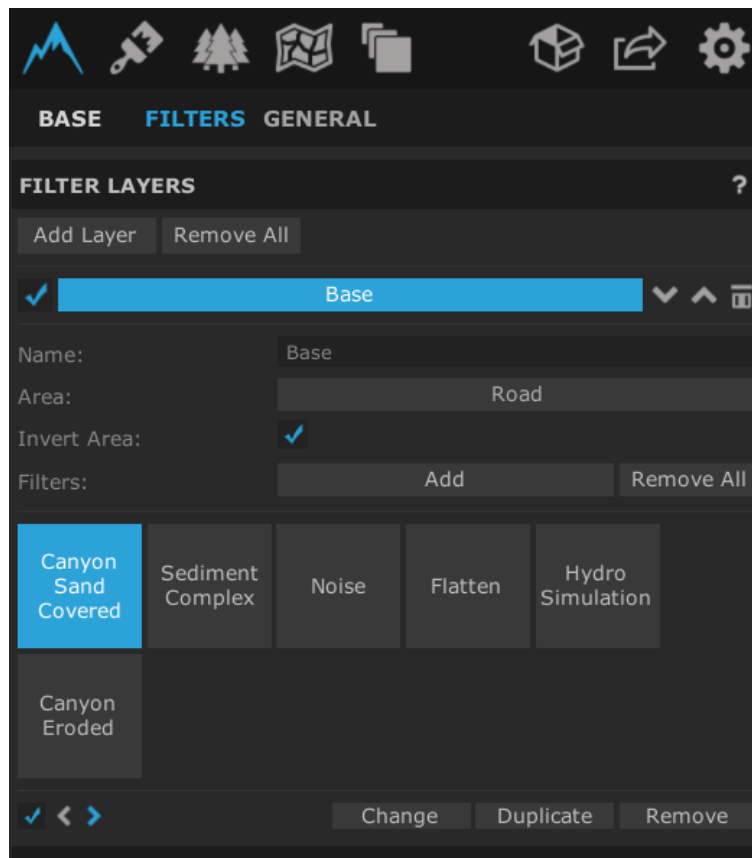


Figure 5.16: Working in World Creator Filter

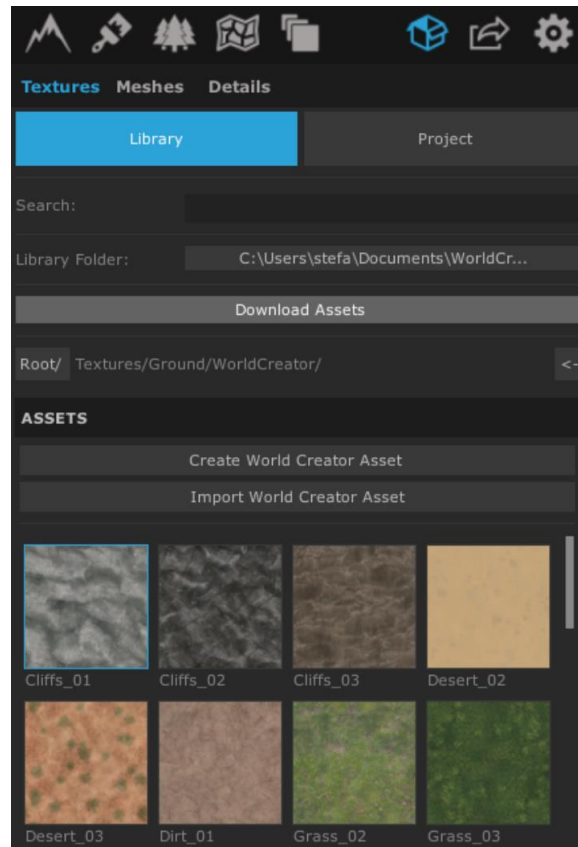


Figure 5.17: Working in World Creator Shading Section

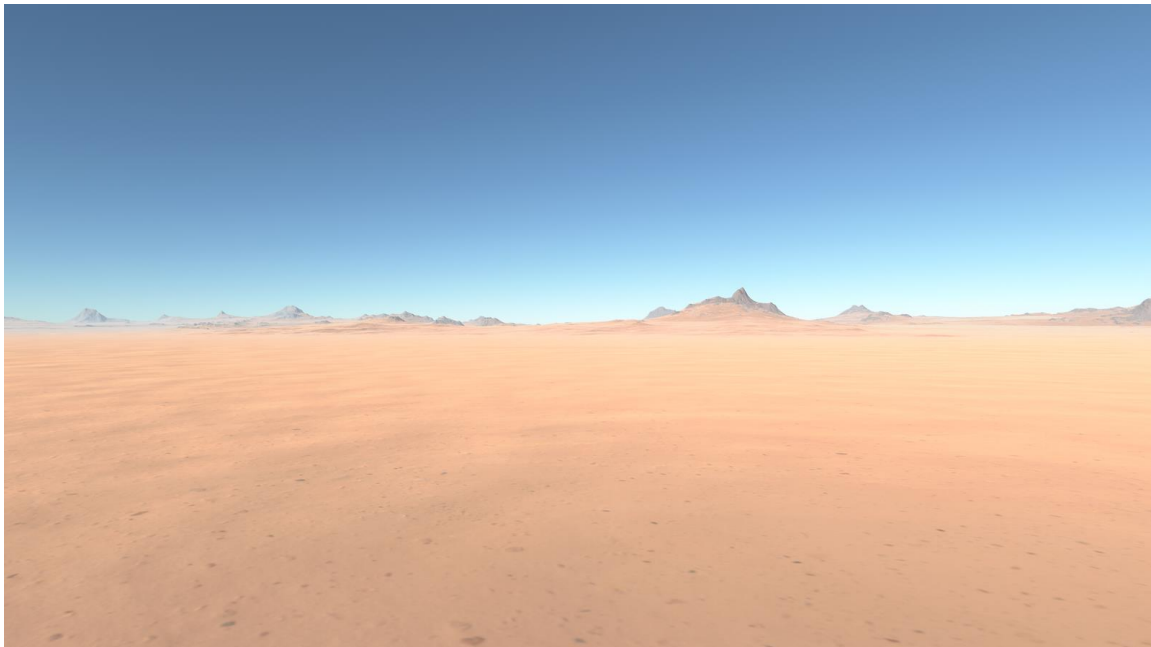


Figure 5.18: Terrain Generation in WC

5.4.4 Terrain Optimization

Exporting terrain from the World Creator is time consuming and the Output result is not satisfactory. Because the Geometry it exported is larger than 10GB and it has 10k-30k million polygons. This level of geometry is not suitable for my workstation and it is not ideal for any use cases. That's why I had to use Houdini to Optimize this mesh. Houdini is powerful enough to import and work with this kind of dense geometry. I create some nodes and attributes for reducing the poly count of our terrain. And Houdini did a surprising job.

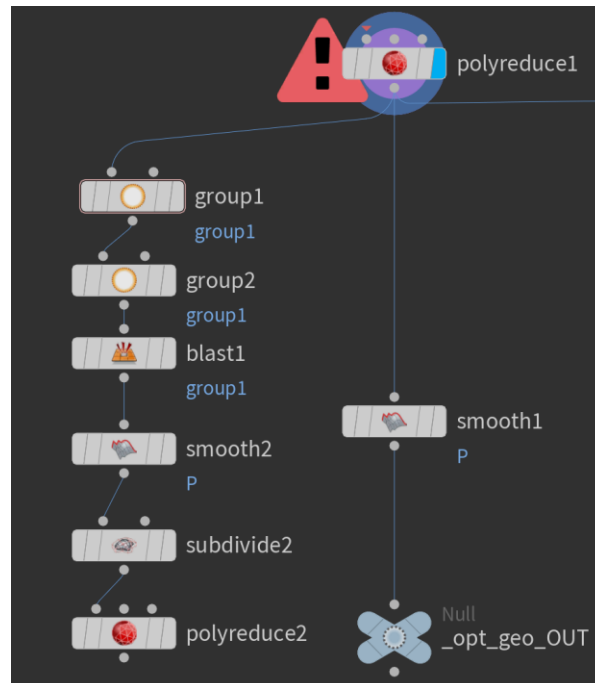


Figure 5.19: Houdini Graph for Poly Reduce

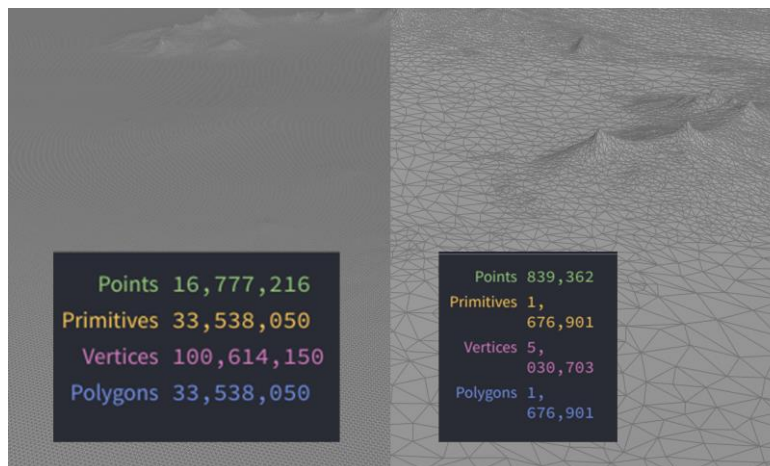


Figure 5.20: Before & After of Optimization

5.5 Simulation

Simulation in houdini is much more intuitive and efficient than any other 3D Software. I chose houdini for its procedural workflow. We need a large-scale storm. This type of Storm is not made with Particles but Volumetric Fluid in VFX tools. And there are no other tools that can handle this level of volumetric fluid simulation. And the solver that used to make this kind of simulation is called Pyro.

5.5.1 Understanding Pyro

Pyro is a solver of Houdini Volumetric Fluid Solver. We can create fire, smoke or any kind of explosion, not only that it is also used in fluid-like phenomena such as mist or dust particles. Even though Pyro is a Volumetric Fluid solver it cannot solve fluid properties. For simulating liquid there are FLIP solvers.

5.5.2 Setting up Pyro

Simulation can be time-consuming so it is important to save the file and folder standard and maintain the naming scheme because every frame creates an individual file but if somehow one file went missing it is very unlikely to recover that particular file. After that I created 3 types of Nodes for our Pyro Simulation to Work.

- **Sourcing (Emitter Creation)**
- **DOP Simulation**
- **SOP Network**

All 3 sets of nodes have their own purpose in this pyro simulation.

5.5.3 Working with Pyro Sourcing

Everything needs a source or origin to create and that's what this node is responsible for. We can make source objects from anything. It can be particles or objects. But in our case I am going to use particles for sourcing. Because particles are more versatile to work with. Because it is a storm, we need a lot of variation and a lot of noise. And particles are easier to apply than objects. After that I add the “Pyro Source” node to the Main simulation. Pyro Source nodes convert geometry to attributes like “temperature”, “density”, “vel” etc.

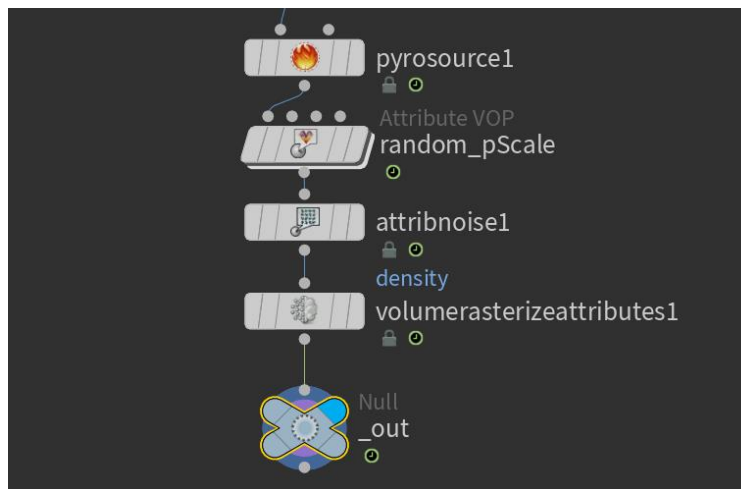


Figure 5.21: Node graph of Pyro Sourcing

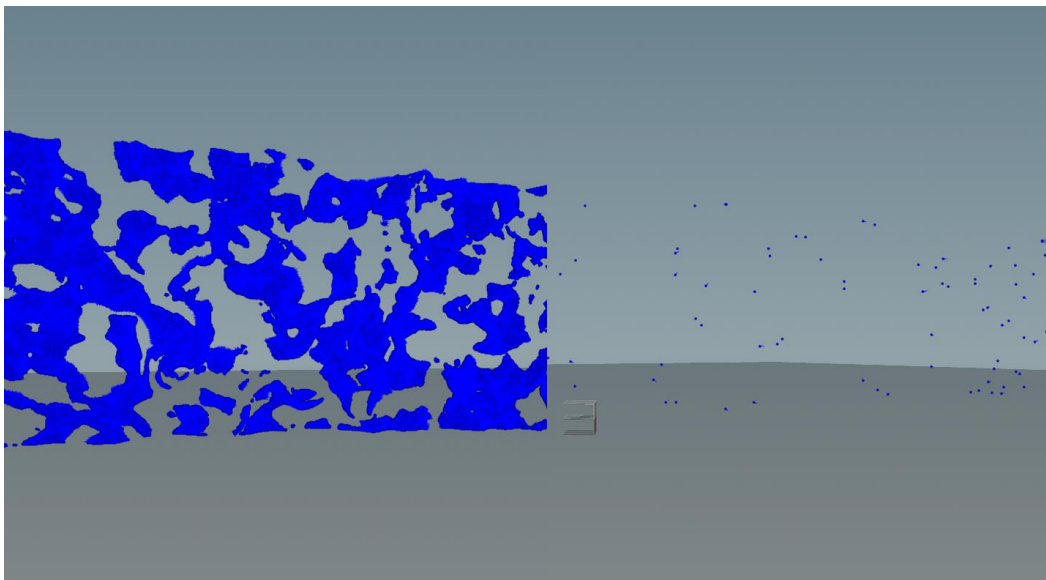


Figure 5.22: Mesh to Particles Creation

5.5.4 Working with DOP Simulation

3 components are essential to building a pyro dynamics network and that are the Objects, Sourcing, and the Solver. There are 3 Primary nodes required in DOP for Pyro Simulation. But that is not it, additional nodes may be needed depending on the scene such as “Gravity Field”, Noise, Ground, etc.

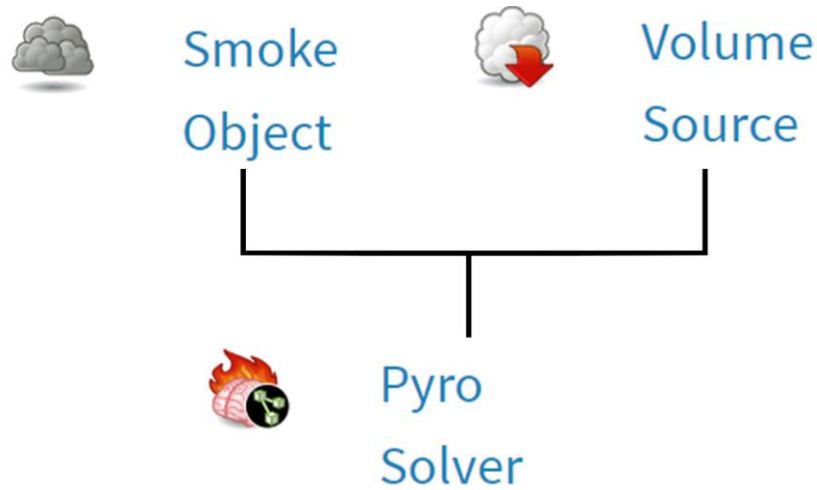


Figure 5.23: Pyro DOP Structure

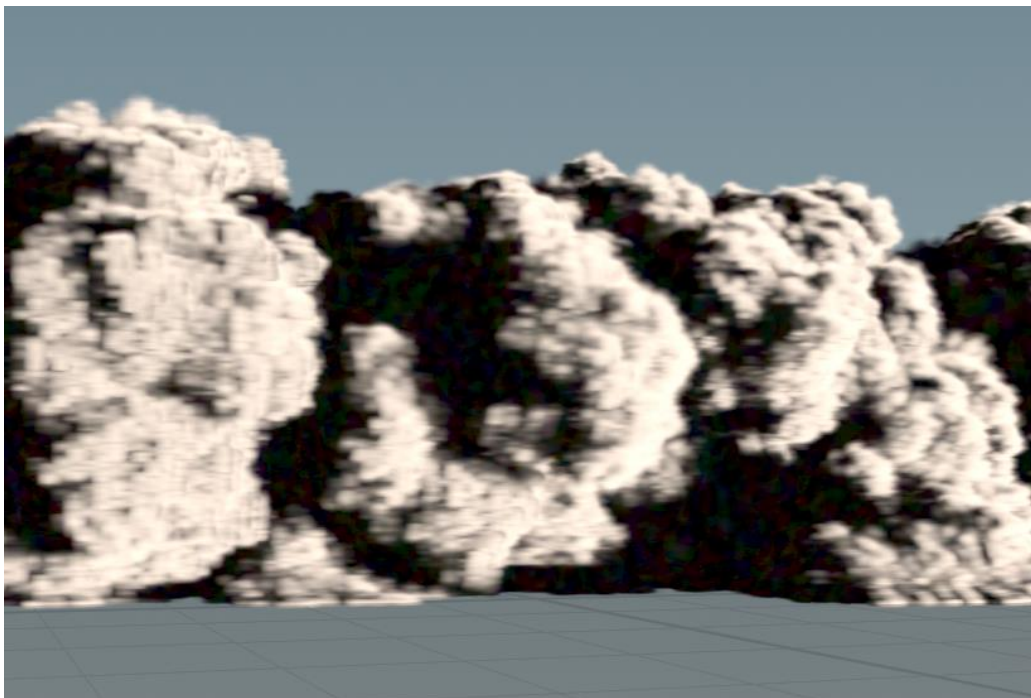


Figure 5.24: Final Simulation in DOP Network

5.5.5 Working with SOP Network

My simulation is complete with the last Step in DOP Simulation. But this is an Extra Step for keeping everything tight and consistent. If we use simulation data from DOP Simulation it will be harder for future adjustments but recalling our simulation Data from different Networks is a good way to use simulation files. That's why SOP Network is necessary for any kind of simulation workflow.

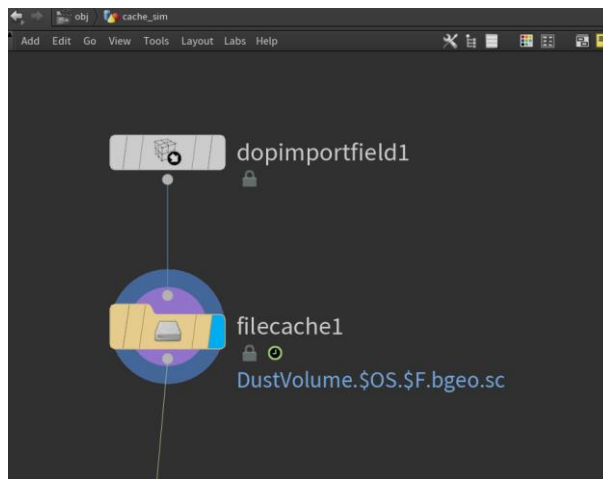


Figure 5.25: Recalling Sim Data from SOP Network

5.5.6 Converting Simulation data to VDB

After finishing the simulation all there is to do is import simulation data back to Maya. But there is a problem. Houdini exports simulation data to a closed source format and we can't use that anywhere other than Houdini itself. So, I had to convert it to a format that Maya can read and converted it to a VDB file. VDB format is an open-source software library developed by DreamWorks. VDB stored sparse volumetric data.

The bright side of using VDB is that every DCC supports this. That means I can use it anywhere I want without losing vel, temperature, density parameters. Because VDB file can hold multiple attribute and variable.

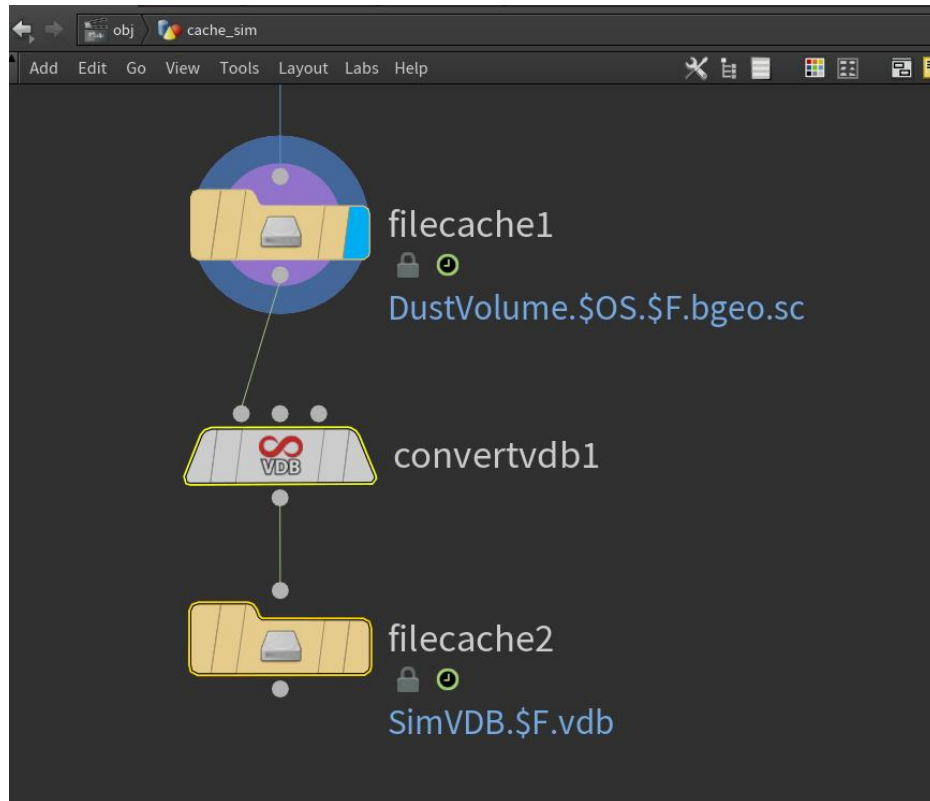


Figure 5.26: Converting to VDB format

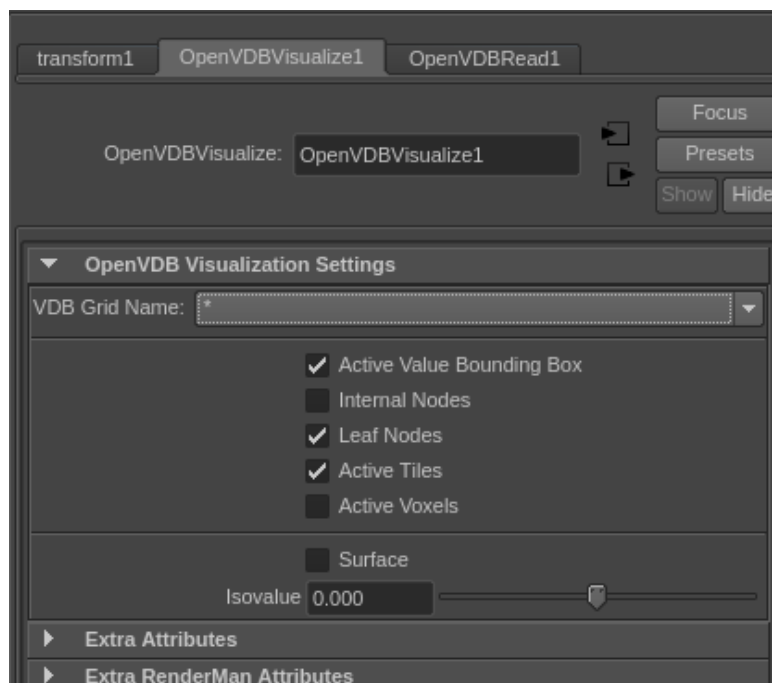


Figure 5.27: Importing VDB in Maya

5.6 Lighting

Illumination or Lighting is life on 3D Scene. Without lighting everything is Black. So even though lighting seems easy but without doing it properly It can affect overall quality. There are many types of light that can be used in 3D scenes. Such as,

- Directional Light
- Area Light
- Point Light
- Spot Light
- Hdri Light
- Ambient Light
- Mesh Light etc.

But in our project, I only use 3 types of lighting for illuminating the scene.

They are,

- Sky Light
- Hdri Light
- Directional Light

5.6.1 Environment Lighting

For lighting our environment, I used only SkyLight and Hdri Image Based Light. SkyLight for Main light with a small amount of harsh shadow with bright diffuse. And On the other side Hdri light for ambience lighting with soft shadow.

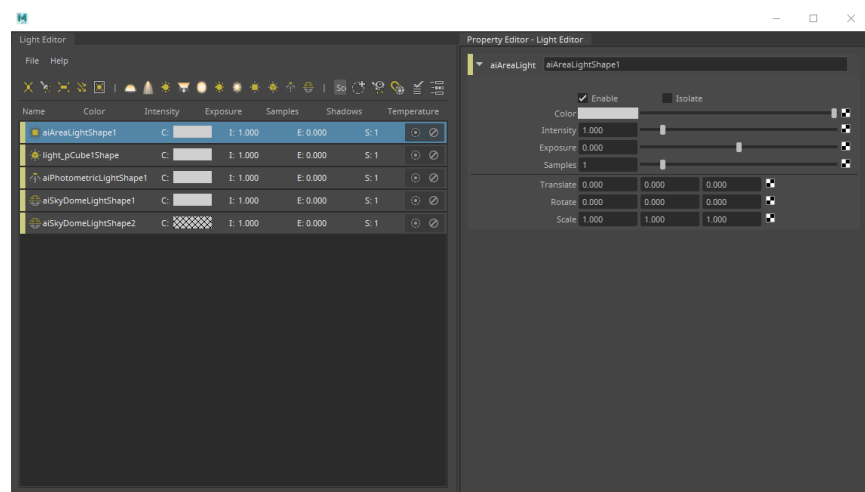


Figure 5.28: Managing Properties in Maya Light Editor

5.6.2 Volume Lighting

Volume lighting is similar to omni directional lighting which origin from a single point and spread all direction. But rather than certain point or plane it can have specific shape to it. It has a boundary unlike directional light, skylight, point light or spotlight. Volumetric light can only illuminate within its boundary or volumetric shape. The most interesting and unique feature of volumetric light is it can generate effect like fog or smoke. Volume light particles also can self-illuminate.

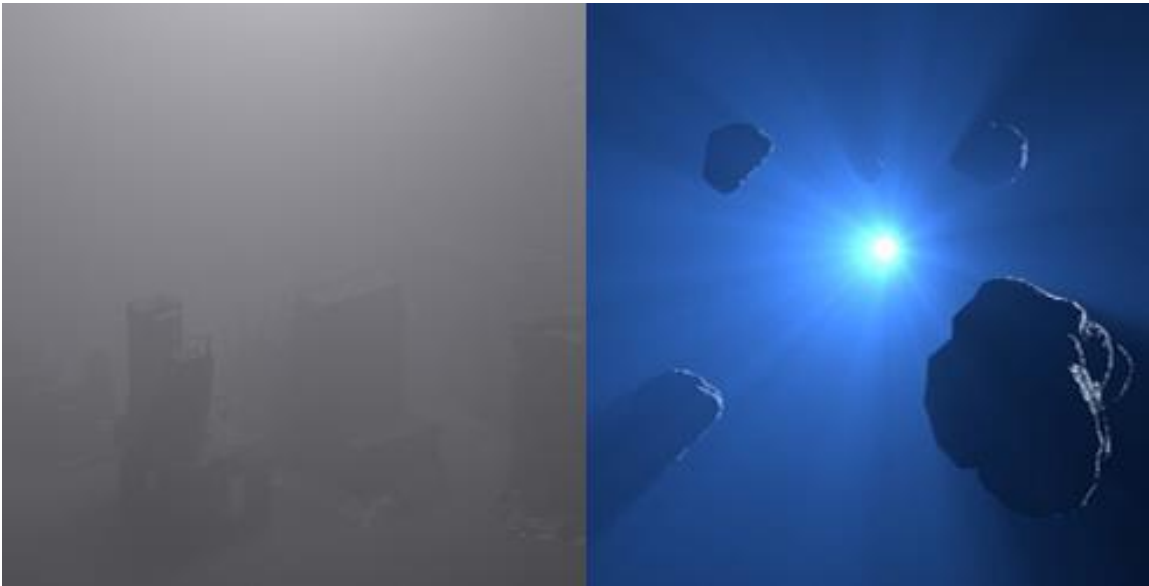


Figure 5.29: Volume Lighting

5.6.3 Ambient Lighting

Ambient light is a completely different type of light source than any other light. It doesn't cast any hard rays or hard shadows. But then it is an important type of light. In nature it is a very common type of light. It creates different mood depending on time, season, weather etc. Different renderers or 3D applications implement this type of light differently. Such as one program creates a specific light source for ambient light and others don't include any type of ambient light source. In that case we have to create this type of light effect manually with point light or directional light.

5.6.4 Per Object Lighting

Normally I didn't do per object lighting in Open Environment or Outdoor Environment. But in this case, I did per object lighting just because Our Droid Character is the only object in the scene. There are not many objects for light to bounce. That's why per object lighting is important in our project.

5.6.5 Maya Light Linking for Advanced Lighting

When we use multiple big sourced lighting, it becomes easier to mess up the scene. That's why we need to control how our light should behave and which object they illuminate. Per object light is an example that needs Lighting to discard unnecessary illumination.

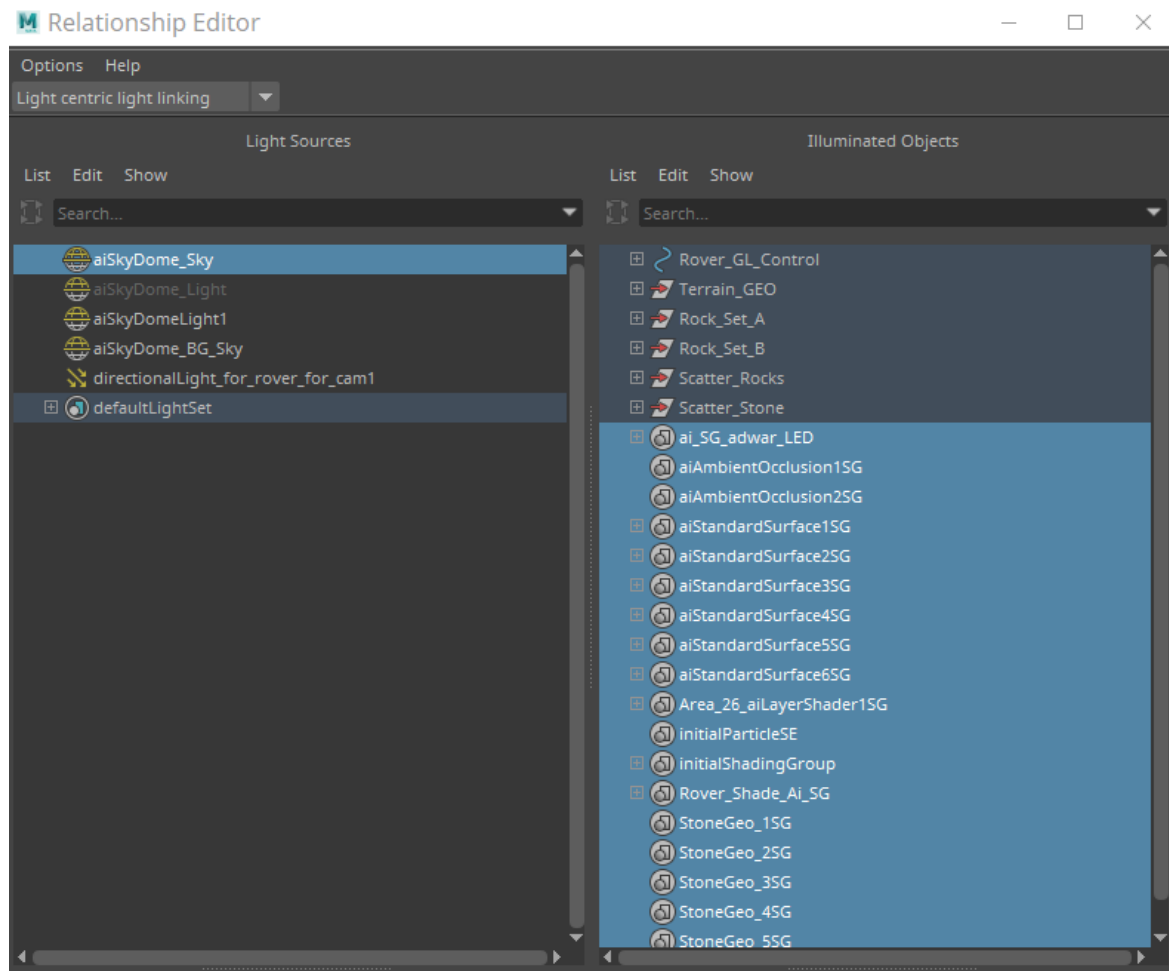


Figure 5.30: Maya Light Linking Technique

5.7 Look Development / Visual Development

Lookdev or Visual Development is the Last stage before Final Rendering. As we know PBR Material can be unpredictable. This is because the look of PBR Material depends on how light bounces on Metallic-Roughness or Specular-Glossiness Maps. That's why we must have to Lookdev every scene from every camera angle manually. The result of Lookdev depends on the audience so it can't be automated. Sometimes Lookdev took quite a lot of production time. It's ideal to share the Lookdev result with the team for a better outcome. That's why I shared the scene with my teammate for the suggestion.

5.7.1 Biased Vs Unbiased Renderer

In rendering pipeline there are two types of renderers, Biased and Unbiased. Basically, means one is Limited where user set the limit which called biased and other one is based on true scientifically and mathematically controlled where user get very few amounts of control over the render engine.

Some of Unbiased renderer,

- Arnold
- Maxwell
- Octane

Some of Biased renderer,

- V-Ray
- Redshift
- Render Man

In Our project I chose Arnold specifically because it comes pre-install with our Maya 2022 Student version and its convenience. But I really wanted to chose any type of biased renderer because of its functionality and faineancy.

5.7.1 Quality Control

From start to end the quality of a production must be consistent. Lookdev is also responsible for Render Quality and Time. We can't just give Random values to sample amounts. To identify the reasonable sample amount, we need proper lookdev and checkup thoroughly.



Figure 5.31: Sequence wise Lookdev 1

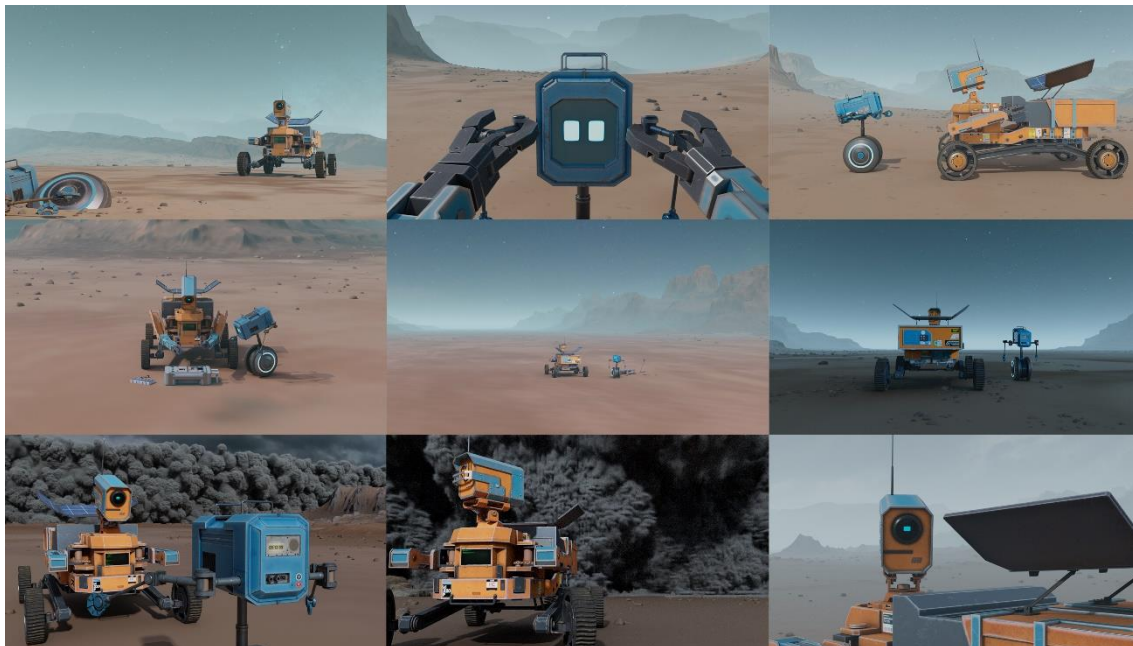


Figure 5.32: Sequence wise Lookdev 2

5.8 Project Management

Managing a full Pipeline of CG Short Film is another challenging task. This Project has a lot of scenes and variations with the huge Texture Library. This project has almost 45+ Main Scene with 20+ Additional Scene. 35+ GB Texture Library, 10 GB Asset Library, 200+ GB Simulation Data and many more. That's why I did in-depth optimization for every scene and that took over a week for me. Then managing the Texture library and Renaming with Variation has also become important for us because different scenes require different types of texture.

11							Render Time				
12	Hierarchy	File Name	Start	End	Frame	Status	(Frame)	(Total)	Render Stats	Backup	
13											
14	Shot 01										
15	cam1:	Scene-AD01/SceneAD01	20	170	150	Optimized	LookDev	1.8m	4.30h	Done	Done
16	cam2:	--	--	--	--	Skipped					
17	cam3:	Scene-AD02/SceneAD02	100	180	80	Optimized	LookDev	3.5m	4.34h	Done	Done
18											
19	Shot 02										
20	cam1:	Scene-AD03/SceneAD03	20	180	160	Optimized	LookDev	2.8m	7.10h	Done	Done
21	cam2:	--	--	--	--	Skipped					
22	cam3:	--	--	--	--	Skipped					
23	cam4:	--	--	--	--	Skipped					
24											
25	Shot 03										
26	cam1:	Scene-AD04/SceneAD04	1	150	150	Optimized	LookDev	2.6m	6.30h	Done	Done
27											
28	Shot 04										
29	cam1:	Scene-AD05/SceneAD05	1	250	250	Optimized	LookDev	1.94m	8.5h	Done	Done
30	cam2:	Scene-AD06/SceneAD06	460	600	140	Optimized	LookDev	2.8m	6.2h	Done	Done
31											
32	Shot 05										
33	cam1:	Scene-AD07/SceneAD07	1	96	96	Optimized	LookDev	2.77m	4.26h	Done	Done
34	cam1(sim):	Scene-AD08/SceneAD08	1	96	96	Optimized	Skipped			Discarded	
35	cam2:	Scene-AD09/SceneAD09	70		1	Optimized	LookDev	2m	2m	Done	Done
36	cam3:	Scene-AD10/SceneAD10	1	100	100	Optimized	LookDev	2.15m	3.35h	Done	Done
37											
38	Shot 06										
39	cam1:	Scene-AD11/SceneAD11	1	200	200	Optimized	LookDev				
40	cam2:	Scene-AD12/SceneAD12	210	330	120	Optimized	LookDev				
41	cam3:	Scene-AD13/SceneAD13	330	400	70	Optimized	LookDev				
42	cam4:	Scene-AD14/SceneAD14	330	520	190	Optimized	LookDev				

Figure 5.33: Scene Management and Progress Tracking

CHAPTER 6

CHALLENGES

Each difficulty reveals a fresh solution or presents us with new opportunity.

ADWAR has reached the finish line after approximately four months of hard effort. While there are some problems in the project, there are also some crucial learning opportunities for the developing team.

The difficulties we encountered-

- Mechanical Character Rig and Animation
- Character Facial Expression
- Large Scale Simulation and Rendering
- Quality control in Lookdev and Rendering
- Sound Design and Compositing
- Project Management

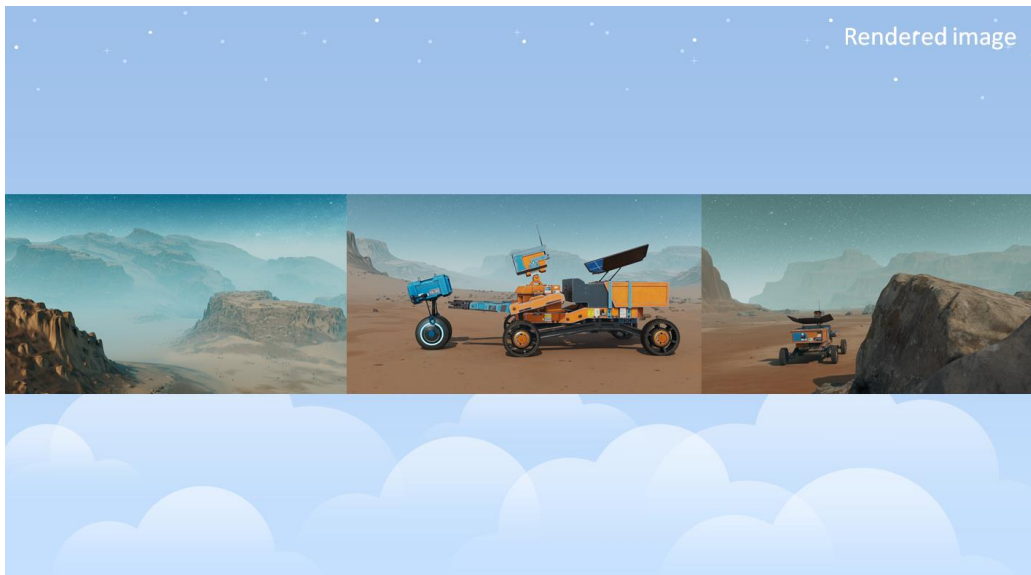


Figure 6.1: Rendered images

CHAPTER 7

DISCUSSIONS

On the basis of their rover's model, ADWAR and Planet Unknown's short video share a little resemblance. Additionally, the environment is strikingly similar to that of Planet Unknown. Each short film features a unique calamity.

There are no further parallels between ADWAR and Planet Unknown apart from those already mentioned. Planet Unknown is a short film about two rovers who are doing their missions until they are unexpectedly confronted with a calamity. Eventually, they complete their task.

There was a lonely rover in the ADWAR short film. It eventually discovers another rover. They grew acquainted. However, a calamity occurs, and they are separated. ADWAR expresses regret and then goes on. Finally, he witnesses a miracle.

ADWAR is a short film that functions as a metaphor for a specific human feeling. The Unknown Planet, on the other hand, is a short film about the finding of life on another planet. As a result, we can see that ADWAR and the Planet Unknown short film have a significant difference.

CHAPTER 8

FUTURE WORKING OPPORTUNITIES

According to the industry standard methodology, the entire pipeline took around four months to complete. This project has been made possible by a lot of hard effort and perseverance, which contributes to its success. We put up our best effort to complete the task. However, there are several faults in the project as a whole.

Every piece of high-quality work necessitates the expenditure of dollars in order to progress correctly. The budget for this project was straightforward. We subscribed to the audio source, which we paid for out of pocket.

In addition to inspiring the next generation of our department, we believe that this effort will also inspire some artists in Bangladesh. As a result, the project has a great deal of potential. If we are given a budget to develop some projects, we can assure that we will be able to produce some high-quality work that is superior to that produced by ADWAR.

When it comes to making a contribution to this industry, films like ADWAR are a fantastic way to go. On the other hand, there aren't many animated films produced in Bangladesh, which is surprising. Thus, it is imperative that some actions be taken in order to create some animations and compete in the global market.

We also have a plan to make a sequel to this film in the future, as this is only the beginning of our endeavors. At the conclusion of the film, the main character, ADWAR, discovers something new, which serves as a prelude to the film's next sequel. The fact that the development team attempted to pull off such a surprise must have been obvious to those in attendance.

CHAPTER 9

CONCLUSION

ADWAR is more than just a short story; it is also a video that will have an impact on the audience and get them to pause and think about what they have just seen. In order to achieve its primary goal, the film must persuade spectators to consider and conquer their loneliness. The creation of the short film –ADWAR is a humble gesture as well as a test for the future of Bangladesh's animation industry. Our team used industry-standard tools, methods, and processes to ensure that the greatest level of quality was maintained. It goes without saying that in order to produce something, one must be inspired by high-quality work, and thus there may be some comparisons, but retaining high-quality work is a sensible plan.

Despite the fact that animated films are becoming increasingly popular and have a significant market internationally, we are still trailing behind in this field. Our industry's success will be dependent on an increase in qualified workers, the expansion of educational institutions, and the government's willingness to be accommodating and understanding.

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