

SpaceX Travel Level Design Document



SpaceX CRS-8 First Stage Landing

Table of Contents

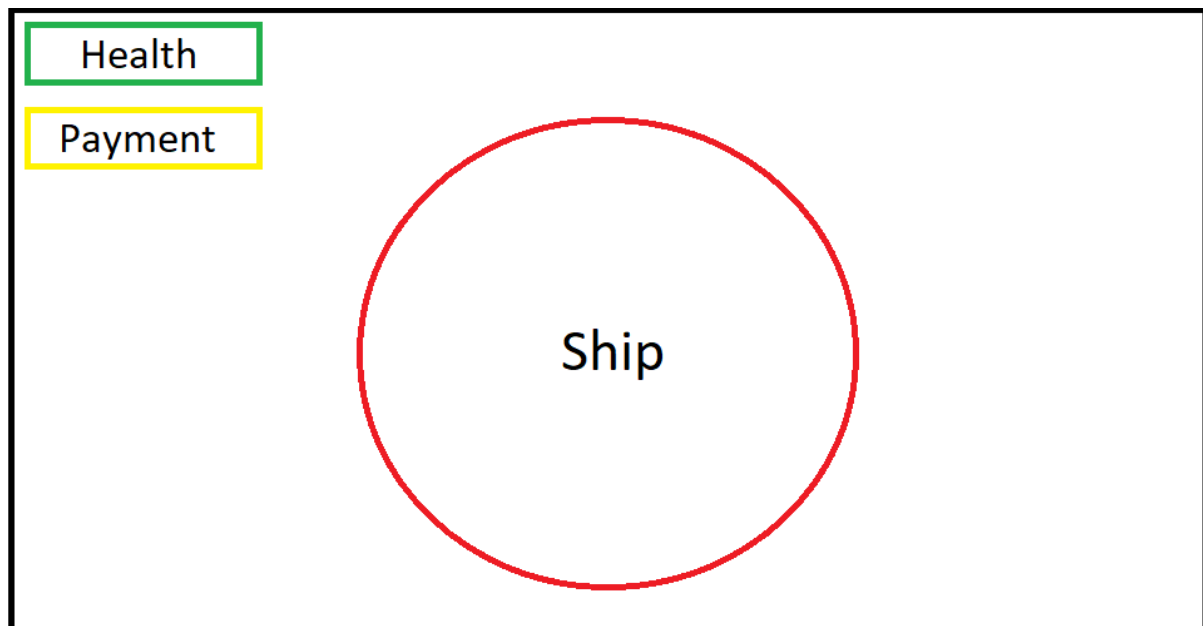
Table of Contents	2
Idea	3
Settings, Theme and Location.....	3
Player Experience.....	3
Environment Features	4
Interactivity	4
Usability and Gameplay Reference and Research	4
Audio	5
Photo/Video Reference and Research	5
Inspiration.....	5
Architecture	6
Environment	7
Lighting	8
Story	8
Top-Down Layout and Schematic of Entire Level	8
Uniqueness	10
Project Planning	10
Reference.....	11
Appendix	11

Idea

As humanity creeps closer to the era of Space, this environment is designed to invoke the wonder and vastness of space. The current leading pioneer is a company called SpaceX led by Elon Musk and so the majority of this game design is drawn from SpaceX's mission.

Settings, Theme and Location

The spaceship that the player is controlling is the package, which needs to be delivered safely from Earth to Mars. There is no time limit which gives the player freedom and enjoyment to explore the Solar System and the only constraint is the health of the spaceship. If the spaceship arrives with no damage, the player will receive full payment, but the payment will decrease as the health decreases. A quick example of the game interface is drawn up below:



Player Experience

There is a psychological effect called “The Overview Effect” which astronauts can experience when they go out to Space for the first time. An Apollo 14 astronaut describes the effect of his view of Earth from space:

You develop an instant global consciousness, a people orientation, an intense dissatisfaction with the state of the world, and a compulsion to do something about it. From out there on the moon, international politics look so petty. You want to grab a politician by the scruff of the neck and drag him a quarter of a million miles out and say, "Look at that, you [censored]". (Edgar Mitchell, 1979)

The environment will aim to replicate this effect by creating a to-scale Solar System with the planets orbiting around the Sun as they would in real life and travelling between the planets will take time – not too short that it will seem like nothing, but also not too long to give a sense of how vast Space actually is.

Environment Features

On Earth's base, the player can fly around the area and the player can exit the area whenever they want. As this game is set slightly in the future, the launch base will be like an airport because a spaceship can take off as easily as a plane can currently. When the player has left Earth's atmosphere, the player can then fly around Earth but not get onto Earth's surface. The only way the player can re-enter Earth is to go to where the base was and request an entry. This same idea will be applied to Mars – only being able to enter at the location of Mars's base.

This is so the player can admire the Solar System's planets and moons by flying around them. When the player is in the Solar System, the system will be to-scale which will give a sense of how far apart the planets actually are.

Interactivity

There will be a small number of interactions between the environment and the spaceship: crashing into moons, Earth's terrain, Earth's or Mars's buildings, the International Space Station (ISS), dodging or being too close to a planet's gravitational pull and not flying too close to the Sun – as the radiation will damage the ship and its massive gravitational pull can lead the spaceship to a fiery demise.

Another thing to watch out for are small pieces of rock that may crack the spaceship's windows – if they break, the player cannot fly anymore! However if the player manages to navigate to avoid all of the above and lands at Mars's base, full payment is received.

Usability and Gameplay Reference and Research

The spaceship will be viewed in a 3rd person perspective, with the mouse still being able to control the z-axis. To achieve that, the controls are WASD movements to speed up, slow down, banking left or right; if the right mouse button is held down the camera can be panned around, if the mouse is near the top or bottom of the screen, the spaceship will ascent or dive, and the mouse scroll wheel can zoom in and out so the player can see the scale of the planet compared to the spaceship.



GTA5 3rd Person View



World of Warcraft

Audio

Simulating this experience will not require a lot of audio. As the spaceship can take off like a plane, there would not be a “3, 2, 1, Blast Off”, but a nice addition effect would be while the player is in space, the microphone will play back the player’s own breathing to give a sense of emptiness whilst in space.

A nice touch to give a sense of normality would be able to scan the player’s own computer’s music folder and being able to play their music. If that is too difficult or not possible, then a list of the current most popular songs will be compiled into a playlist and allow the player to select any.

Photo/Video Reference and Research

Inspiration

As this game is drawn from SpaceX’s mission to Mars dabbled with futuristic ideas, Earth’s Base and Mars’s Base will be modelled off those ideas. Assets within the Unity Store will be used whenever possible to save time and the assets used will have a requirement of looking “futuristic” so the setting will feel appropriate. An example below is the “Falcon 1874 XB” where the spaceship looks sleek and suitable for a quick journey inside the Solar System.



Falcon 1874 XB

Architecture

The below images are a reference of how the architectural design will aim to replicate. The use of space will give a scale of how large the launch site is and with how the technological advancements allow life on Mars.



SpaceX Launch Site



“The Martian” Habitat

Environment

The Solar System will be to-scale, however a certain limit will be put in place so the player will not take too long to fly between each planet (except Pluto) and to also not make the flight from Earth to Mars a linear flight, the planets would be orbiting around the Sun.

Using Earth as a starting point, information from the National Space Science Data Centre and the Planetary Distance Calculator was used to calculate the distance to each planet:

Sun	149 600 000 km
Mercury	91 691 000 km
Venus	41 400 000 km
ISS	408 km
Moon	384 400 km
Mars	78 340 000 km
Asteroid Belt	254 500 000 km
Jupiter	628 730 000 km
Saturn	1 275 000 000 km
Uranus	2 723 950 000 km
Neptune	4 351 400 000 km
Pluto	7 500 000 000 km

Taking those numbers and even having the baseline of travelling at 100km per second, travelling from Earth to Mars would take 63.31 hours. Using that, travelling from Earth to the Moon would take 6 minutes and that would feel too slow, but to the ISS too fast. I will have to find a sweet spot so travelling to Mars would still invoke that sense of wonder while not being slow, and also to other planets – while not being too fast when passing the Moon and the ISS.

Lighting

The majority of the lighting will come from a literal Sun, and like how the Moon's surface reflects sunlight, extra lighting effects can come from the Moon's reflection and other moon's reflection from other planets. The majority of the room will be dark as it is set in Space, but the spaceship can have headlights dotted around it, and as the planets will be orbiting around the Sun, the planets/moons can have dark sides to them which the player can then fly to and shine a light on.

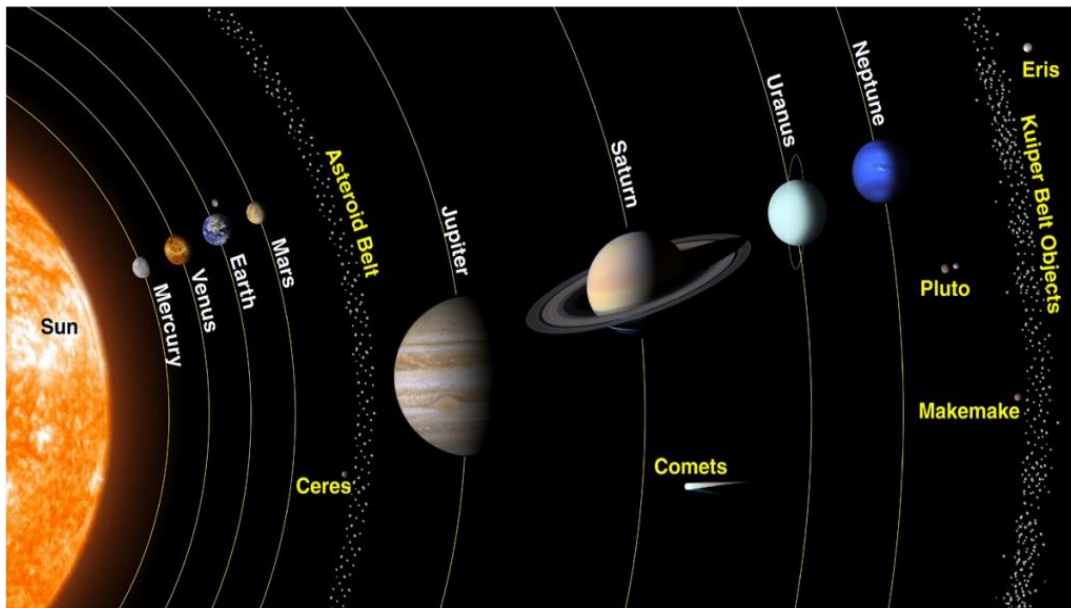
The lighting effect will aim to replicate as much as possible how it would feel like to be in Space, and so sometimes, the only source of light will be coming from the spaceship itself. Entering a planet's atmosphere will also change the lighting, and this is all to achieve a level of immersion akin to an ethereal experience.

Story

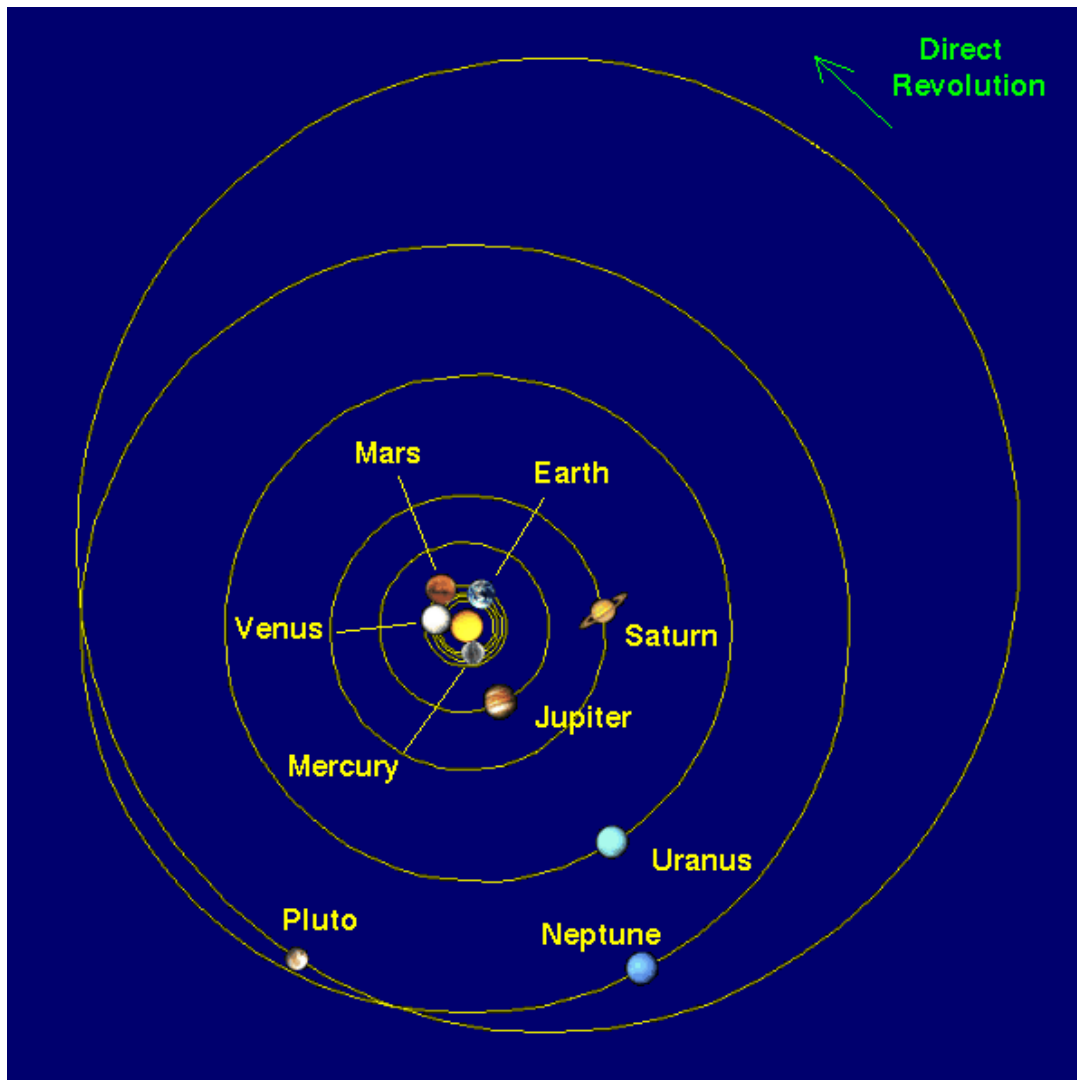
The player will conduct a solo mission of piloting and delivering the spaceship safely to Mars. After extensive training to become pilot, the first mission will not be timed therefore exploration of the Solar System is allowed to satisfy the pilot's curiosity. The only penalty will be if the spaceship is damaged, in which the payment received will be deducted accordingly.

Top-Down Layout and Schematic of Entire Level

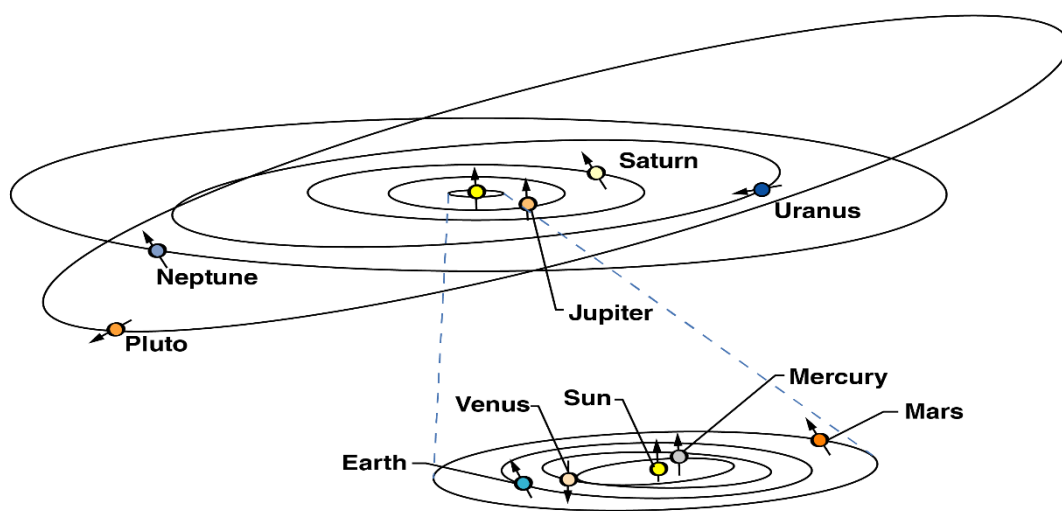
The main room will be modelling off the Solar System – the size, shape, distance, and orbiting of the planets will be as close to real-life as possible.



Position of Planets



Orbit of Planets



3D View of Solar System

Uniqueness



Coming up an environmental game reminded me of Journey (2012 video game). 8 Time Award Winning Game focused on interacting with the environment and other players to figure out puzzles for the storyline to continue. Journey's lighting effects made the environment have a mystical feeling, and coupled with rich audio effects and soundtrack, the game felt like going on a spiritual journey.

SpaceX Travel will try achieve this spiritual feeling by capturing the emptiness of space, the scale of planets as the spaceship flies closer to build the moment of awe and put in perspective of how insignificant and frivolous human problems are.

Project Planning

A breakdown of tasks and their estimate times:

	Week	Task
08/01/18	01	Think up of game idea
15/01/18	02	Start writing up Design Document
22/01/18	03	Start Unity Earth's Base
29/01/18	04	Unity Earth's Base
05/02/18	05	Solar System
12/02/18	06	Polish Design Document
19/02/18	07	23 rd Feb – Hand in Design Document
26/02/18	08	Mars's Base
05/03/18	09	Rest of Solar System
12/03/18	10	Rest of Solar System
19/03/18	12	Rest of Solar System
26/03/18	13	30 th March – Hand in Unity Game

Gantt Project 2.8 will be used to create a real-time Gantt chart that will be updated as the current tasks are completed in the SpaceX GitHub repository. This will show the difference between my estimated time and actual time.

Reference

3D View of Solar System [Online] Available:

https://commons.wikimedia.org/wiki/File:Orbits_of_the_planets_including_pluto.png

Falcon 1874 XB [Online] Available:

<https://assetstore.unity.com/packages/3d/vehicles/space/spaceship-falcon-1874-xb-54816>

GTA5 3rd Person View [Online] Available: <https://wccfttech.com/gta-v-may-ditch-steam/>

Journey (2012 Video Game) [Online] Available:

<https://indiegamerchick.com/2012/03/09/journey/>

Orbit of Planets [Online] Available:

<https://astronomy.stackexchange.com/questions/1979/why-are-most-planetary-orbits-nearly-circular>

Position of Planets [Online] Available: <https://theplanets.org/solar-system/>

SpaceX CRS-8 First Stage Landing [Online] Available:

<https://www.flickr.com/photos/spacex/25790039543>

SpaceX Launch Site [Online] Available: <https://www.teslarati.com/spacex-expands-facility-cape-canaveral-gears-extremely-high-rate-launch-land-missions/>

“The Martian” Habitat [Online] Available: <https://www.artstation.com/artwork/nyalr>

World of Warcraft [Online] Available: <https://i.kinja-img.com/gawker-media/image/upload/wv1ugcna9b8wmnnk8tyz.png>

Appendix

Edgar Mitchell (1979) The Overview Effect [Online] Available:

<http://www.nmspacemuseum.org/halloffame/detail.php?id=45>

National Space Science Data Centre Planetary Fact Sheet [Online] Available:

<https://nssdc.gsfc.nasa.gov/planetary/factsheet/index.html>

Planetary Distance Calculator Distance Between Planets [Online] Available:

<https://theplanets.org/distances-between-planets/>

Gantt Project 2.8 Gantt Chart Software [Online] Available:

<http://www.ganttproject.biz/pilsen>

8 Time Award Winning Game [Online] Available:

[https://en.wikipedia.org/wiki/Journey_\(2012_video_game\)](https://en.wikipedia.org/wiki/Journey_(2012_video_game))