

# **DESIGN DOCUMENT**

## **Station Echo**

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**TEAM 14**

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# 1 Game Overview

## 1.1 Introduction

Station Echo is a 3D puzzle-platformer set aboard an abandoned orbital facility. The player takes control of a small maintenance robot trapped after a catastrophic system failure on the station.

The core feature of the game is the ability to change the direction of gravity, allowing the player to discover new routes and solve spatial challenges in creative ways.

The project blends an atmospheric sci-fi setting, logical problem-solving, and platforming dynamics, achieving a balance between exploration, reasoning, and agility. Developed in Unity, the game is designed as a student project focused on delivering unique gameplay mechanics within a compact but well-polished level.

## 1.2 Story

In the distant future humanity operates automated orbital stations—self-sustaining shipyards that serve as repair docks and refueling points for spacecraft traveling across the galaxy.

Station Echo was one such facility, responsible for maintaining decommissioned ships. During the repair of a large vessel, a catastrophic malfunction occurred, disabling the safety systems and leaving the station derelict.

Years later, an autonomous maintenance unit is reactivated. Its memory is corrupted, and it retains a single directive: **Send a distress signal (SOS)**.

To complete this mission, the robot must navigate through the broken modules of the station — filled with debris, inactive systems, and environmental hazards. Each section of the station presents a new puzzle that requires precision, adaptability, and mastery of gravity manipulation to progress toward the communication module.

## 1.3 Core Concept and Central Mechanic

The core concept of Station Echo revolves around exploration and problem-solving through gravity manipulation.

The player interacts with environmental elements such as buttons, switches, and energy panels to change the gravity vector, redefining what is "up" or "down" in the environment.

This mechanic transforms the gameplay experience — affecting not only movement, but also puzzle logic and spatial orientation. Each level challenges the player to think in three dimensions, using gravity not as a limitation, but as a creative tool to navigate and overcome obstacles.

## 2 Gameplay

The core gameplay of **Station Echo** is built around three main pillars: **movement**, **gravity manipulation**, and **object interaction**. These systems are closely interconnected, forming a dynamic gameplay loop where precision, timing, and awareness are essential for progression.

### 2.1 Movement

The player controls a small maintenance robot using standard keyboard and mouse inputs:

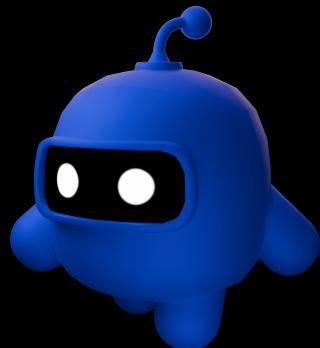
- W, A, S, D: move relative to the camera direction;
- E: interaction with objects
- Space bar: jump and double jump;
- Mouse Movement: control the camera view and orientation around the character.

The movement system is designed to be camera-relative, ensuring intuitive navigation even when gravity changes.

Each action — walking, jumping, falling, interacting, or landing — is accompanied by dedicated animations, which provide fluidity and responsiveness to the controls.



(a) idle



(b) walking



(c) running



(d) dying

Image 1: Player states visualized

## 2.2 Gravity

The core feature of Station Echo is the ability to alter gravity direction. In the initial implementation, player will be able to switch gravities direction upward and downward. Gravity shifts are triggered through interaction objects, such as:

- **Gravity Switches**
- **Energy Terminals**
- **Energy Panels**

Upon activation, the global gravity vector is changed, affecting both the player and all physics-based objects in the scene. This mechanic allows for unique puzzle-solving opportunities, where perception and spatial orientation become key components of gameplay.

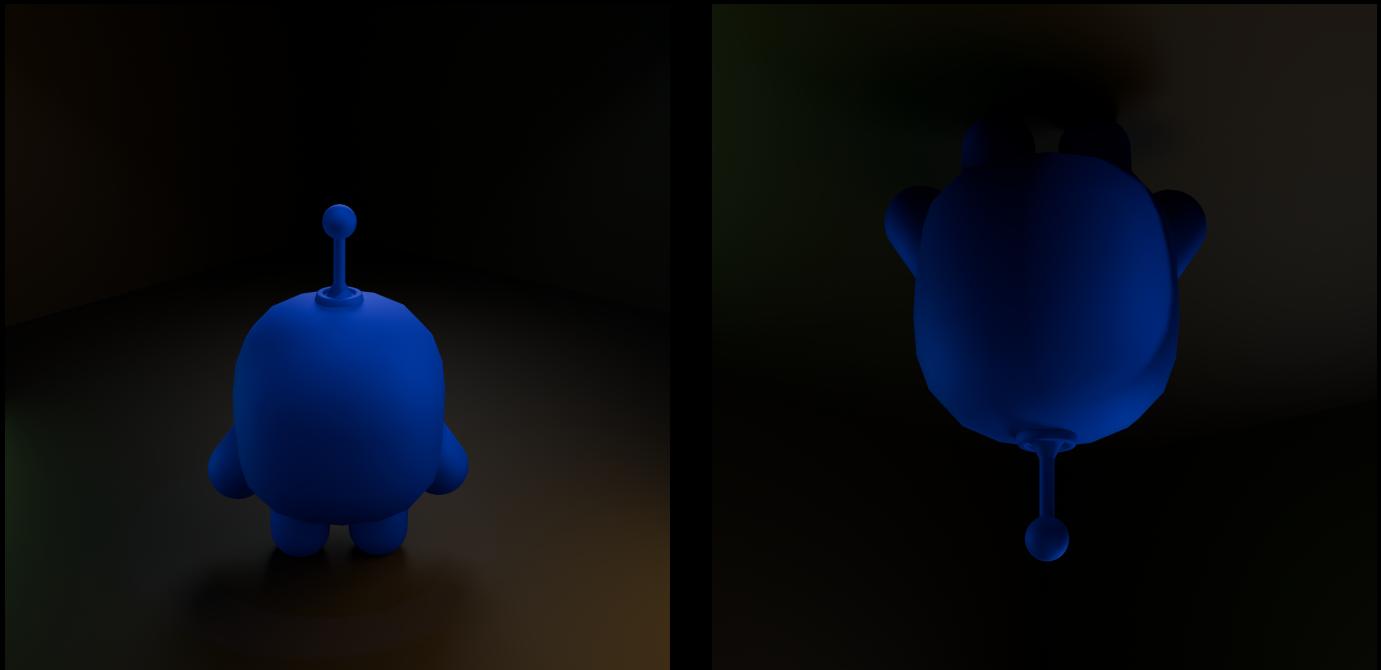


Image 2: Gravity shift from an outside perspective

## 2.3 Objects of interest

The environment contains multiple interactive mechanisms that respond to energy input, including:

- **Airlocks (Gates):** Open when powered;
- **Moving Platforms:** Travel between fixed points;
- **Lifting Platforms:** Rise or descend depending on active power flow.

Power can be supplied through different control devices:

- **Pressure Plates:** Remain active while pressed by a player or object;
- **Switches:** Toggles between on/off states;
- **Energy Terminals:** Activate the system for a limited duration before automatically deactivating.

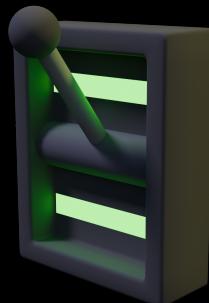
This layered system encourages experimentation and sequencing, as players must combine these elements strategically to unlock new areas, alter gravity, and advance through the level.



(a) terminal



(b) panel



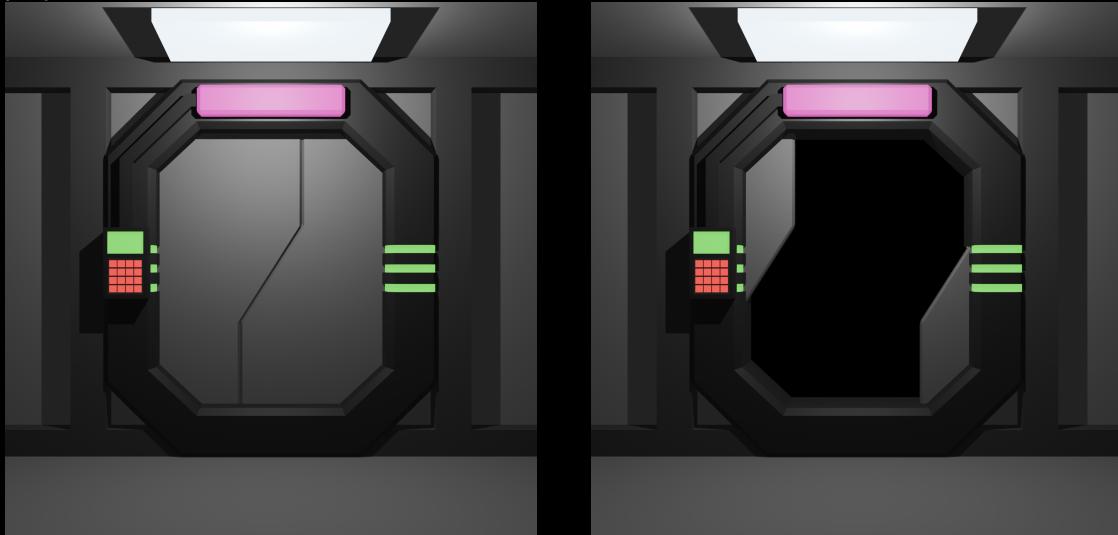
(c) switch

Image 3: Several interactable objects

## 2.4 Interaction with doors

Doors serve as one of the most common obstacles within the environment, acting as dynamic barriers that require specific actions to open. Each door can be connected to multiple control inputs, such as switches, pressure plates, or buttons.

The game logic allows an arbitrarily large number of control inputs to be assigned to each door, enabling the creation of many different logical gates (AND, OR, XOR, etc.) enriching the gameplay.



## 2.5 Game-over mechanics

To raise the stakes, each level introduces environmental hazards such as deep pits or lethal traps. These dangers challenge the player to perform precise movements, make quick decisions, and plan their actions carefully.

Failure to navigate safely results in the player's destruction and a restart from the most recent checkpoint. Some sections also feature time-sensitive challenges, in which the player must complete a sequence before a system failure or environmental collapse occurs.



## 3 Graphic Design

The visual direction of Station Echo combines sci-fi futurism with minimalist design principles. This approach provides a clean, recognizable aesthetic while reducing the workload associated with animation, modeling, and texturing — an essential factor for a student project.

### 3.1 Visual Style and Atmosphere

The game world reflects a futuristic orbital station aesthetic — metallic surfaces, neon lighting, and clean geometric shapes. The color palette consists mainly of cool tones such as gray, blue and white with bright orange and cyan highlights marking interactive objects and energy sources.

Minimalistic art style enhances clarity and focus, allowing players to easily distinguish functional gameplay elements from the environment. The visual tone emphasizes isolation, technology, and the quiet tension of a malfunctioning station.

### 3.2 Optimization and Implementation

All assets are developed with performance in mind. Models follow a low-poly workflow, supported by PBR materials and normal maps to achieve surface detail without excessive geometry. Lighting relies primarily on baked illumination, with select dynamic light sources for interactive elements such as switches, terminals, and panels.

Character and object animations adopt a simplified, stylized form, ensuring consistency with the minimalist architecture of the game and making the development pipeline manageable for a small team.



## 4 Level design

### 4.1 Introduction to game mechanics

The first few levels are designed to provide a gradual and seamless introduction to the core game mechanics, ensuring that the player is not overwhelmed. The early levels focus on simple navigation, basic platforming, and single-step gravity manipulation. As the player progresses, new mechanics and challenges are introduced incrementally, allowing them to master one concept before combining it with others.

Each level is unlocked after the previous one is completed, encouraging a structured learning experience while maintaining a sense of exploration and achievement.

### 4.2 Puzzle Integration and interactive objects

Levels are designed around key interactive objects, including:

- **Gravity Switches:** Allow the player to change the global gravity direction, forming the core of puzzle design.
- **Energy Panels and Terminals:** Require timed activation or sequencing to progress.
- **Switches and Pressure plates:** Enable logic-based puzzle design.
- **Doors and Gates:** Serve as progression blockers, requiring puzzle completion to open.
- **Moving and Lifting Platforms:** Introduce timing challenges and vertical navigation.

