

DESIGN DOCUMENT

Station Echo

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TEAM 14

Yaroslav Danko, Oleksandr Koshchii, Ihor Holub, Nazar Vasyltsiv

Contents

1 Game Overview	3
1.1 Introduction	3
1.2 Story	3
1.3 Core Concept and Central Mechanic	3
2 Gameplay	4
2.1 Movement	4
2.2 Gravity	5
2.3 Interaction with Objects	6
3 Graphic Design	7
3.1 Visual Style and Atmosphere	7
3.2 Optimization and Implementation	7

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 alter 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 a unique gameplay mechanic 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 reactivates. Its memory is corrupted, and it retains only 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, chasms, inactive systems, and environmental hazards. Each section of the station presents a new puzzle, requiring 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:

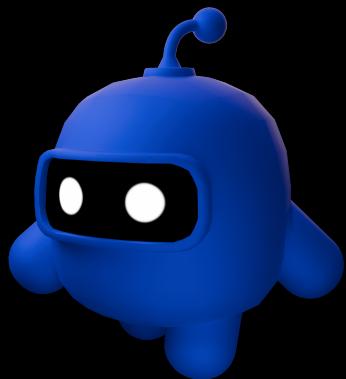
- W, A, S, D — move relative to the camera direction;
- Spacebar — jump (supports a double jump mechanic);
- Mouse Movement — control the camera view and orientation around the character.

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

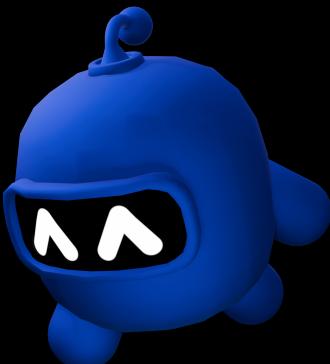
Each player action — walking, jumping, falling, interacting, or landing — is accompanied by dedicated animations, providing fluidity and responsiveness to the controls.



(a) idle



(b) walking



(c) running



(d) dying

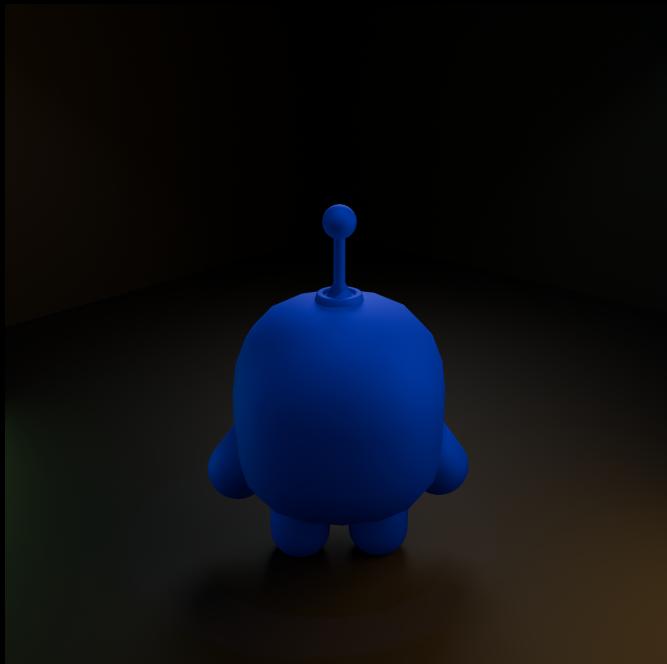
2.2 Gravity

The core feature of Station Echo is the ability to alter gravity direction. In the initial implementation, the player will be able to switch gravity 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 recalibrated, 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.



(a) down



(b) up

description: camera view

2.3 Interaction with Objects

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 Plate** — remains active while pressed by a player or object;
- **Switch** — toggles between on/off states;
- **Energy Terminal** — activates the system for a limited duration before deactivating automatically.

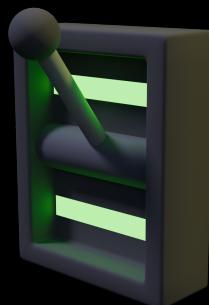
This layered system encourages experimentation and sequencing, as players must combine these elements strategically to unlock new areas, alter gravity, and advance through the level.



(a) terminal



(b) panel



(c) switch

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 (gray, blue, white) with bright orange and cyan highlights marking interactive objects and energy sources.

The minimalist 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 efficiency 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 like switches, terminals, and panels.

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

