PART 2 – PROTOTYPE

This chapter describes a first software prototype of the main game mechanics and shows our findings based on its evaluation. The prototype already incorporates the following concepts of the final game:

- Pseudo-randomly moving islands with colliding pillar interactions.
- Players who can move in the XZ plane and jump from platform to platform using a jetpack.
- Long-range attacks of players using the ice spike skill.
- Melee attacks of players.
- Visualization aids assisting players to navigate in the 3D space using shadows.
- Power-ups which are placed on islands.

We decided to approximate all the game elements with very simple geometric primitives. Although later islands might not have a flat surface in the final game, this simplified contact and collision detection a lot. Their movement is based on two forces: First, they get attracted by all the pillars whereas the force is quadratic to the distance. Second, we add a random force in each frame to prevent them from converging at one point.

The player's movement is divided into two parts: using the gamepads left analog-stick he can move in the xz-plane, while the a-button activates the jetpack allowing him to move up the y-axis. This movement is calculated by a simple acceleration of the jetpack, which is added to the player's velocity vector in each time step. Gravity acceleration works against the jetpack and keeps a player standing on an island – and (in the worst case) falling down into the lava. If players walk into each other they receive a minor velocity-based pushback. A stronger pushback is encountered, if one player hits another.

Shadows are realized by real-time shadow maps. At the moment, they use no interpolation in the look-up stage which leads to very jagged artifacts at steep angles. However, the sole purpose of a shadow implementation at this stage was to determine whether or not shadows would serve well to support players navigating on the islands.

The ice spike implements a homing mechanism. After the spike is set off, the spike gets slightly pulled into the direction of an enemy. However, we have an upper bound for this force in order not to make aiming too easy.

For easier tracking of hits (either melee or through ice-spikes) appropriate sounds were also added.

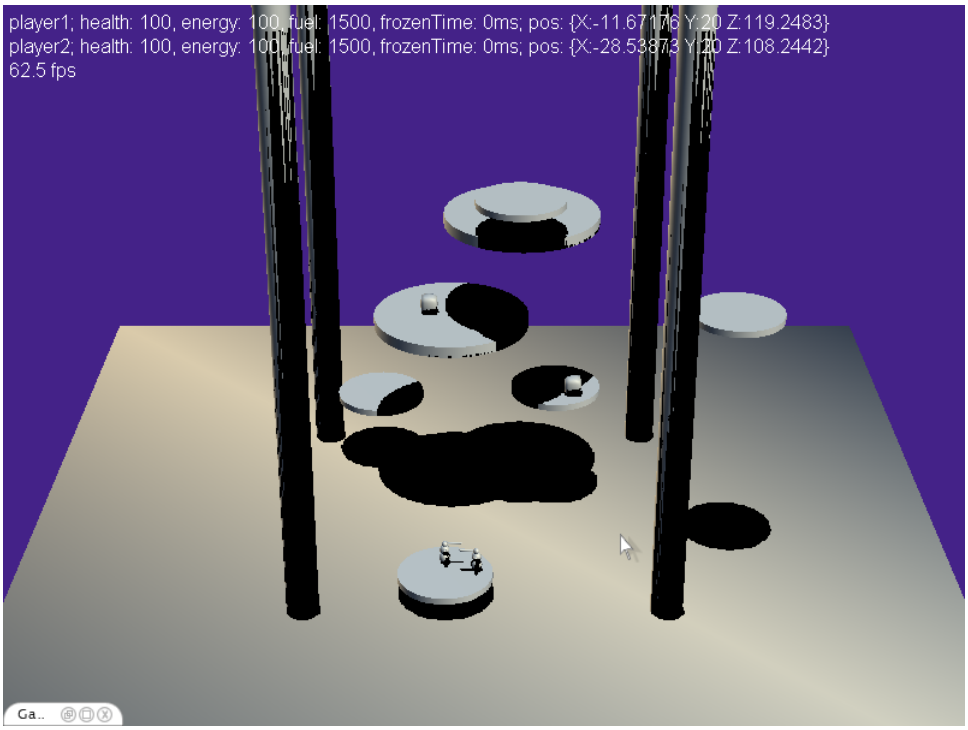
EVALUATION

We have tested the game (and will continue to do so a lot within the upcoming days) with respect to the following criteria:

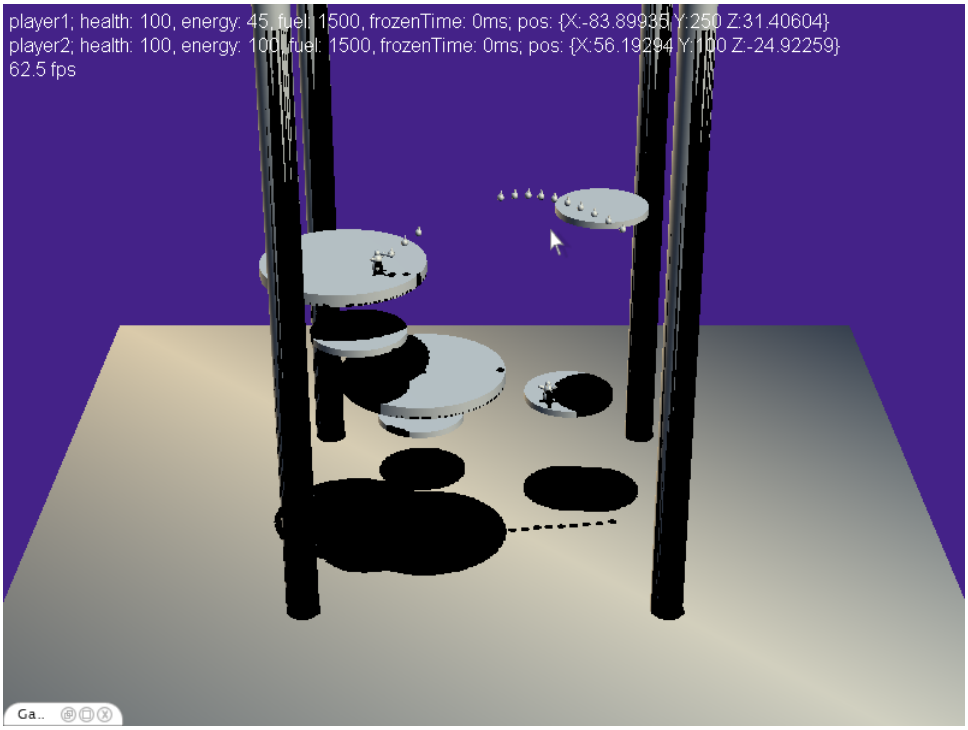
- Is it easy and intuitive to move the player and perform attack actions?
- Does the core game play make fun, even after playing it for several minutes?

While the latter question is common and crucial for every game concept, the former one is one raised by multiple reviewers of our original concept. By testing this point in a very early phase, we want to react properly to the feedback we've got in the first stage.

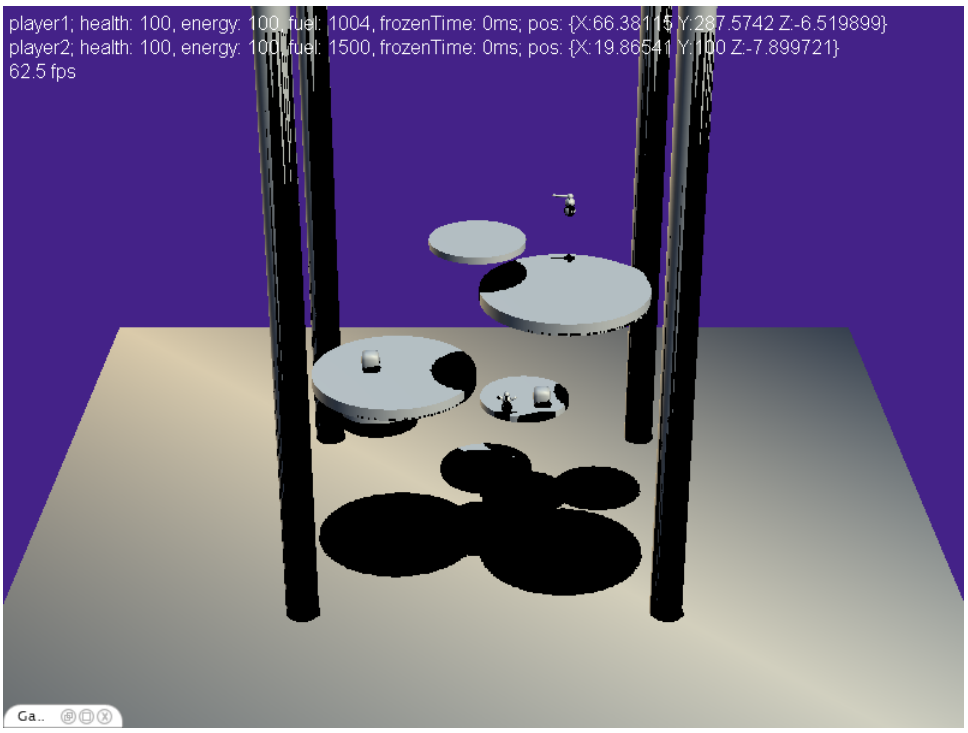
GAMEPLAY SCREENSHOTS



Two players are standing on a moving island. Two collectable power-ups are on other islands. A player's health, energy and fuel level is currently shown as a text label. Later, this will be replaced by a graphical HUD.



A player is shooting a bunch of ice-spikes, although missing his enemy.



A player is using his jetpack to move to the smaller, upper island. As visible in the text on top, using the jetpack needs fuel.

FINDINGS

POSITIONING

It is still quite tough to position yourself in the 3D environment. To make the task easier, we added shadows to enable the player to look at the projection of the island and his robot to more easily track his position. To control a player hidden behind an island or another object, we will implement some feature showing his contours projected onto such an object. This could also be combined with shadowing in a way a player gets a marker on all islands below and above him.

Finally, we will have to do further experiments with the angle and focal length used for the camera to reduce positioning problems.

PLAYER MOVEMENT

Currently, a player can walk off an island, which is a very unfortunate and leads to sudden death. It would make sense to only allow the player from falling of an island if he explicitly uses his jetpack or other means of traveling between the islands. Otherwise, He should not be able to walk beyond the edge of the island. We will implement this behavior in a further version.

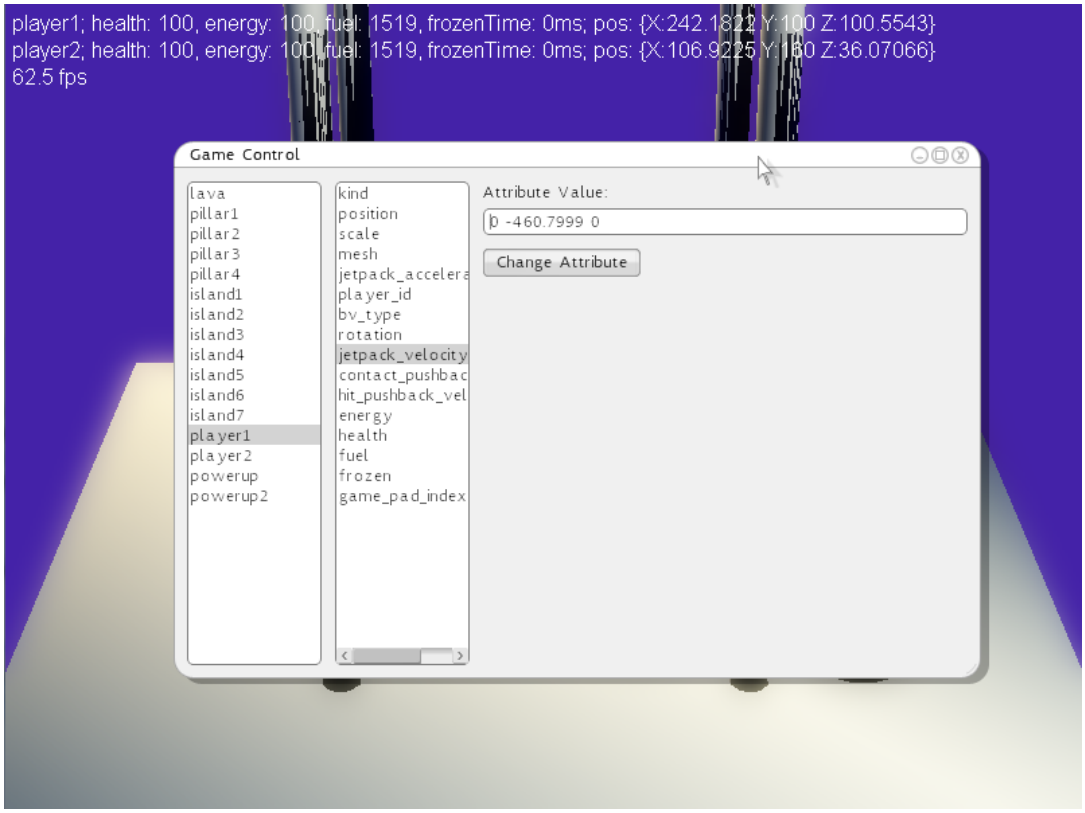
ISLAND TRAVEL

Using free jetpack movement, it is nearly impossible to move between islands, because of mentioned 3D positioning and tracking problems. Therefore, a more passive approach (like

selecting the island and automatic flying) should be taken. This could also have the advantage that a player can look around and shoot spikes at his opponents while flying. Additionally, the path on which an island moves should be visualized in the future (for instance by small rings of dust). Therefore the path of an island will have to be fixed or at least calculated in advanced to visualize where an island will move to some time from now.

PARAMETER TUNING

Without the need to drastically change certain implementations and aspects of the game, one can heavily improve the experience by tuning parameters (e.g. attack damage, gravity or jetpack acceleration). To simplify this task and in order to allow fast testing of different parameters, we implemented a game console which shows the state of all active entities on the screen and enables the user to directly manipulate them:



An in-game console which allows the modification of parameters and attributes of all the present entities.