PROOF THEORY

Solve for Adventure

CONFIDENTIAL REFERENCE

Game Design Document

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TABLE OF CONTENTS

General....8
Overview....8
White Box....8
Audience....8
Strategy....8
Genre....8
Platform....8
Concept....9
Landscape....9
Story....9
Themes....9
"Proof Theory"....10
Action....10
Art....11
Style....11
Modeling....11
Animation....11
Lighting and Color....11
Cinematic....12
User Interface....12
Fonts....12
Characters....13
Player Avatar....13
Robots....13
Sentry....14
Bomber....14
Turret....14
Boss....14
Environment....15
Section 1....15
Elevator Shaft....15
Cargo Bay....16
Section 2....16
Ventilation System....16
Security Control Room....17
Exit Detours....18
Section 3....18
Observation Deck....18
Ambush Point....19
Section 4....19
Factory Floor....20
Invitation Kill Box....21
Section 5....21

Bridge Trenches....21
Bridge Walkway....22
Tower Entrance....22
Level Elements....22
Elevators....22
Control Panels....22
Vent Access Grates....23
Vent Fans....23
Blast Doors....23
Storage Crates....23
Security Control Console....23
Security Control Servers....23
Maintenance Ladders....24
Columns....24
Lifts....24
Cover Blocks....24
Stairs, Platforms and Walkways....24
Factory Line Elements....24
Factory Supply Structure....24
Factory Parts....25
Factory Palettes....25
Factory Mechanics....25
Energy Recharge Pad....25
Props....25
S.T.A.T....25
Energy Gun....26
Energy Box....26
Visual Effects....26
Beginning Sequence....26
Player Hints....26
Camera Shake....26
Pain Fades....27
Respawn Sequence....27
Stealth Vision....27
Energy Gun Projectile....27
Energy Projectile Trail....27
Energy Projectile Impact....27
Robot Explosion....27
Security Control Console Lights....28
Energy Box Explosion....28
Factory Line Spot Weld....28
Blast Door Lights....28
Boss shield Impact....28
Boss Plate Impact Sparks....29
Boss Part Explosion....29

Boss Final Explosion....29
End Sequence....29
Development Materials Sequence....29
Audio....30
SFX....30
Characters....30
Player Avatar....30
Robots....30
Boss....30
Props....30
S.T.A.T....30
Energy Gun....31
Energy Box....31
Level Dynamics....31
Blast Doors / Trap Doors....31
Elevators / Lifts....31
Control Panels....31
Hatches / Vent Covers....31
Vent Fans....32
Security Control Console....32
Energy Recharge Pad....32
Factory Line Mechanics....32
Walkway Collapse....32
Effects....32
Energy Gun Fire....32
Energy Gun Projectile....33
Energy Gun Impact....33
Robot Explosion....33
Boss Shield Impact....33
Boss Plate Impact....33
Boss Part Explosion....33
Boss Final Explosion....33
User Interface....34
Menu....34
Music....34
Tone....34
Progression....34
Voice....34
Design....35
Priorities....35
Storytelling....35
S.T.A.T. Analysis....35
Environmental Storytelling....35
Player Action Advancement....35
Surprise Events....36

User Interface....36
Player Controls....36
System Feedback....36
Heads Up Display....36
Menus....37
Character Design....37
Player Avatar....38
Robots....38
Sentry....39
Bomber....39
Turret....40
Boss....40
Level Design....41
Section 1....42
Progression....42
Layout....42
Features....43
Player Action Result....44
Section 2....44
Progression....44
Layout....45
Features....46
Player Action Result....47
Section 3....47
Progression....47
Layout....49
Features....50
Player Action Result....51
Section 4....51
Progression....51
Layout....54
Features....54
Player Action Result....55
Section 5....55
Progression....55
Layout....57
Features....59
Player Action Result....59
Prop Design....60
S.T.A.T....60
Energy Gun....60
Energy Box....61
Puzzle Design....61
Concept....61
Player Action....62

Procedural Generation....62
Programming....63
Approach....63
Organization....63
Prototype Tests....63
Data....63
System....63
Tools....63
Standards....64
Separation....64
Communication....64
Protection....64
Comments....64
Naming....64
Readability....65
Pipeline....65
Asset Sources....65
Art Development....65
Audio Development....65
Code Development....66
Level Design....66
Game Builds....67
Server Management....67
Testing....67
Test Plan....67
Unit....67
Integration....67
Usability....68
Stress....68
Issue Tracking....68
Bug Reports....68
Feature Extensions....68
Production....69
Methodology....69
Approach....69
Scope....69
Resources....69
Values....69
Experience Priorities....70
Development Priorities....70
Success Criteria....70
Development Progression....70
Concept....70
Prototype....71
Alpha....71

Beta....71
Final....71
Playtesting....71
Test Criteria....71
Feedback Sources....71
Implementation Strategy....72
Appendices....73
Appendix A – GDD Version History....73
Appendix B – Game Secrets....75
Cheats....75
Secrets....75
Trivia....75
Appendix C – TBD....76

GENERAL

OVERVIEW

Proof Theory is primarily a demonstration of senior-level game design skill; specifically of building level design primary layout and crafting multiple scenarios of exciting combat design.

WHITE BOX

This game development **project will proceed to the White Box stage** for level design and Gray Box stage for combat design, with some details continued further for ease-of-use, and for the purpose of user testing.

NOTE: THIS DOCUMENT IS A REFERENCE FOR THE FINAL GAME DESIGN. THE UNIQUE DEVELOPMENT TARGET DESCRIBED ABOVE REQUIRES AN ADDITIONAL FORMAT CONVENTION TO DISAMBIGUATE DESIGN FEATURES. A FEATURE DEFINITION OR DETAIL THAT IS INTENDED TO BE DEVELOPED TO **WHITE BOX IS HIGHLIGHTED IN BLUE,** LIKE SO.

AUDIENCE

Game development professionals familiar with the AAA studio workflow. Action-adventure gamers familiar with the stages of game development. First-person adventure gamers.

STRATEGY

Prioritize **gameplay over aesthetic details**. Invite the audience into the development process. Leverage the first-person shooter perspective to highlight level layout and combat design.

GENRE

First-person shooter (FPS), tactical action with minor puzzles in a story-based adventure.

PLATFORM

For widest and most convenient distribution, **WebGL** / Web Assembly (WASM) builds provide a classic desktop FPS experience with no barrier to entry. Free to play. Access with web link.

CONCEPT

Meet expectations of **modern gameplay**, including tactical combat options, stealth combat, a variety of enemy class encounters, environment exploration, story surprises and minor puzzle-solving.

LANDSCAPE

A **futuristic industrial complex** and command center for an intimidating robot military force. Multiple areas the player will encounter represent a variety of purpose and overlook the wide-ranging complex shown as a large artificial canyon valley with a prominent tower to be discovered during the course of the journey.

THE BROADER LANDSCAPE WILL ONLY BE OUTLINED, LIKE THE CANYON WALLS. THE VALLEY FLOOR WILL BE A SET OF SIMPLE QUAD PRIMITIVES. THE TOWER WILL BE SLIGHTLY MORE DECORATED WITH PRIMITIVES.

STORY

The player **begins mid-infiltration** at the threshold of an elevator that descends into the valley of the complex. The player is alerted to an ambush, which begins an escape that leads the player to use stealth and acquire an enemy robot's gun.

The player continues to **use both stealth and the brute force** of the gun to make their way deeper into the robot complex. They are challenged to sabotage security defenses, defeat robot patrols and succeed in overcoming robot defenses as they become more aware of the player's infiltration.

Near the end, the player grinds through the toughest defenses, and a variety of enemy classes and hazards, using all the tactics and abilities they have acquired, only to arrive at the main control tower of the complex, where **a heavy assault robot** is sent to confront the player.

THE LEVEL SECTIONS OF THE GAME REPRESENT **THE FIRST THIRD OF A FULLER STORY**. AFTER THE PLAYER REACHES THE TOWER, THE OTHER TWO THIRDS OF THE GAME WOULD BE REPRESENTED IN ASCENDING LEVELS WITHIN THE TOWER TO THE PRIMARY COMMAND SYSTEMS AT THE TOP.

By the end of the entire story, the game has revealed the player character's true nature to be a robot, running a simulation as part of **artificial intelligence training**, to prove the success of the actual infiltration mission beforehand.

THEMES

- **Math**, logic, equations, progressive reduction, progressive deduction
- High tech, future tech, artificial constructs, **artificial intelligence**

- **Action**, adventure, challenge, danger
- Dystopian future, man vs machine, **sabotage**
- **Exploration**, mystery, puzzle-solving, (machine) learning

“Proof Theory”

*Proof theory is a major branch of mathematical logic that represents proofs as formal mathematical objects, facilitating their **analysis by mathematical techniques**.*

“Proof” also denotes, “*evidence or argument establishing or helping to establish a fact or the truth of a statement*”, and, ”*a trial impression of a page, taken from type or film and used for making corrections before final printing*.” Or, **a reasoned example of complexity in brief**.

“Theory” also denotes, “*a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained*”, “*a set of principles on which the practice of an activity is based*”, and, “*an idea used to account for a situation or justify a course of action*.” In short, **a guess from which a test can be evaluated**.

ACTION

To ensure the fullest engagement, **the player will be challenged** after learning skills and tactics that afford combat advantages and puzzle-solving.

The interaction loop will be intentionally designed to **respond to the player**'s decisions and actions to establish and maintain a progressive rhythm within the pace of the gameplay.

The following pattern will guide the **sequence of designed gameplay elements**, giving the player the best chance of successfully acquiring advantageous knowledge and practice to overcome the most consequential challenges.

1. **Introduce** the gameplay element *(explaination and demonstration)*
2. **Offer** an option of the gameplay element *(choice and practice)*
3. **Test** the player to perform using the gameplay element *(requirement and commitment)*
4. **Challenge** the player with the gameplay element by introducing a minor change *(creativity and innovation)*
5. **Change** the nature of the gameplay element by setting it against new elements or in novel combination of previously introduced elements *(change and rebirth)*

ART

STYLE

The overall art style aims at a technological future where **artificial life dominates natural life**.

MODELING

The modeling art style needs to be clear, by way of **broad pieces with substantial thickness**. Likewise, texture mapping should respect the goal of clarity through a reduction of detail.

A model design convention, to **break the design down into clarity**, can begin with primary shape, have contrasting shapes that are smaller and less prominent, and finish with the smallest detail accents. The smallest details should still be clearly visible, in full, from a game distance of 5 units (5 meters).

The 3-D models used will be made simply of **geometric primitives** offered by the default game engine. Combinations of primitives will be used to create mildly more complex shapes. That said, these will intentionally result in simple, low-poly models using few materials.

ANIMATION

For animated features, we rely on the movement to **convey more life** to the elements than the feature will have with modeling alone.

Animated features in this game are **mechanical**, and as such, any ease-in or ease-out should be used sparingly. Linear interpolation should be the dominant timing convention, where special exception can be made for features that convey physics, or a special case of artificial life.

The primary character animations will be implemented via **procedural systems** to allow the artificial intelligence full control. The level elements that require animation, including doors, lifts and special level dynamics) will be animated via tools that use transform positions and configured timing to provide movement that appears intentionally mechanical. Visual effect animation will be handled via in-engine particle systems and custom procedural tools.

LIGHTING AND COLOR

Outdoor environments will be lit **primarily by sunlight** (early afternoon). Indoor environments

will be lit by periodic wall and ceiling-mounted lighting (spotlights, point lights) This basic lighting is meant to provide base visual information and convey the industrial setting.

As an industrial setting, made from and for robots, the color and lighting should primarily be **utilitarian**. The less-traveled locations, such as maintenance passages, may contain disabled or flickering light, and some rust or stain color.

THE LEVEL DESIGN WILL DEMONSTRATE DEVELOPMENT TO "**WHITE BOX**" STAGE, AND AS SUCH, MATERIALS WILL BE WHITE, AND COMBINE WITH LIGHTING DESCRIBED ABOVE. THE OVERALL COLOR HUES WILL RANGE FROM DARK GRAY TO RUST TO EGG SHELL WHITE.

From section to section, players will encounter **accent color to highlight features** of the level design, or special effects.

CINEMATIC

Only **simple cinematic details** are called for, including fade to and from black in level transitions and during the respawn sequence. Likewise, the start and end of the game will use simple fades to maintain player focus.

USER INTERFACE

Menus are utilitarian and direct. Simple toggle displays provide the player with opportunity to view game credits and game controls.

The **HUD** is used in-game to display the gun reticle, the currently held tool, and to provide a platform for the S.T.A.T. which has the purpose of delivering narrative and instruction.

The S.T.A.T. (Surveillance and Tactical Analysis Tool) also is seen as part of the world, as sort of a Head-Up-Display indicating a navigation target and a look target to activate. The navigation target includes an additional location display used when the player is far from the target.

In-game hints are shown as augmented level elements that pulse with bright color, and the potential to display additional text overlays of instruction for the player.

Fonts

Two fonts are consistently used to **support game themes** in two distinct modes of the game.

AR Destine

The **main game utilizes AR Destine** for all text in menus, HUD, S.T.A.T. displays and hints.

Homespun

The **hacking puzzle utilizes Homespun** for instructions, bit display and banner notification.

CHARACTERS

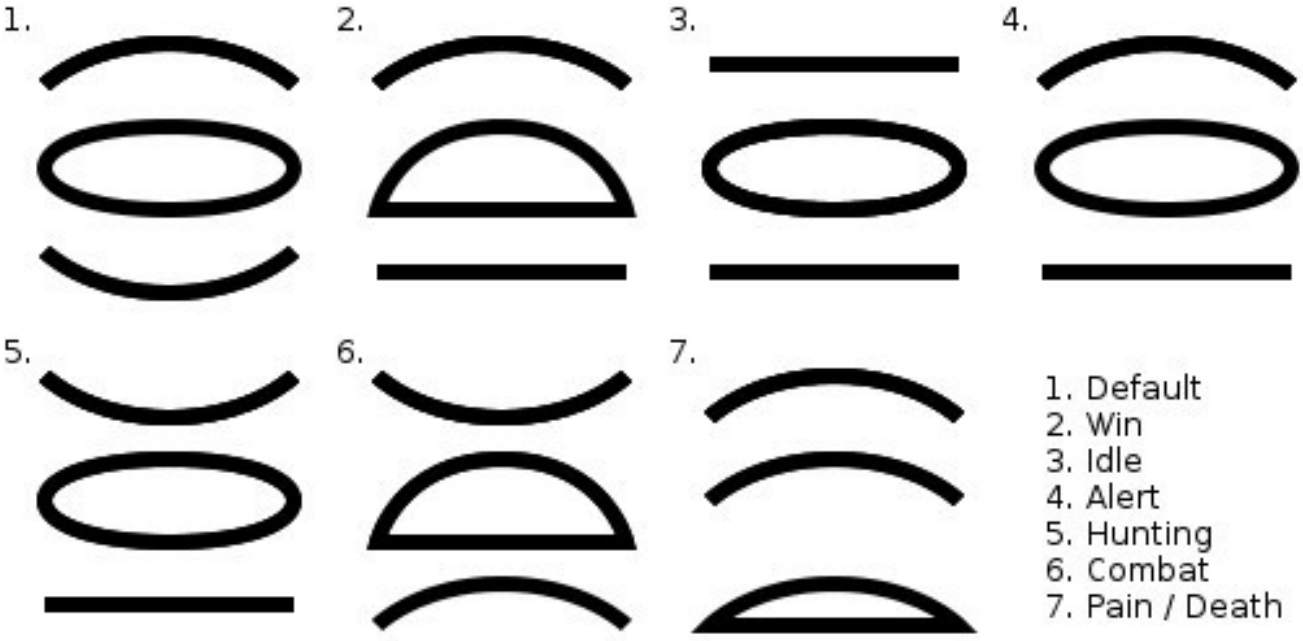
The characters in this adventure are **built for conflict**.

PLAYER AVATAR

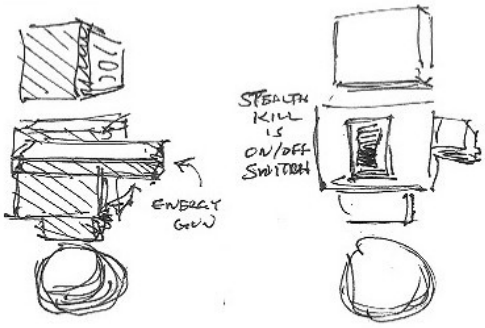
The player avatar is **a first-person character** with no visible display, except for the energy gun, once acquired from a robot sentry.

ROBOTS

Robot characters are made of connected primitive parts. These parts are accented by glowing parts. They are able to **emote via a facial display**.



[Chart – Robot facial displays]



Sentry

The Sentry is roughly the same size as the player. **Slim and built from parts** that represent a roller ball for locomotion, a hip base, a chest piece, a head piece and a gun on the right side.

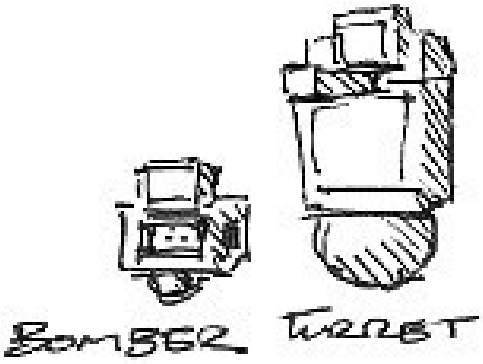
[Character Sketch – Sentry robot]

Bomber

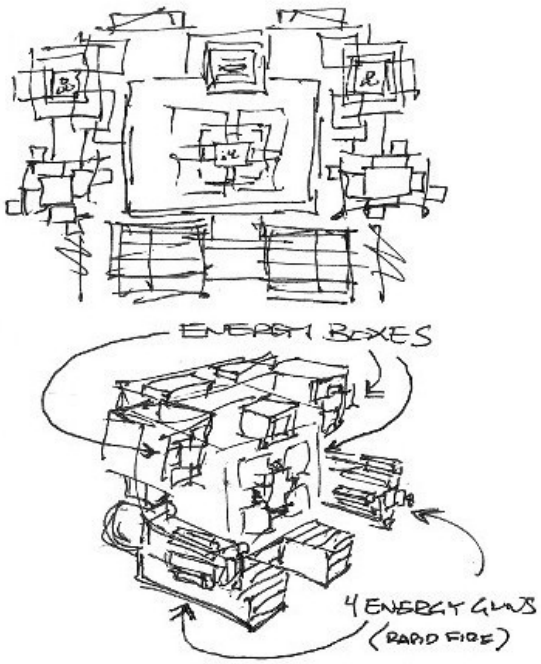
The Bomber is a pint-sized variant with **an energy box for a body**, a roller ball for locomotion and a smaller head piece.

Turret

The Turret is **a more substantial variant** of the Sentry with a thick chest piece and hip base. The gun of the Turret is centered and mounted at the chin of the head piece.



[Character Sketch – Bomber and Turret robots]



Boss

The Boss is **a heavy assault robot**, bearing little resemblance to the other variants, other than the head piece. The massive frame of this robot contains an energy box in each shoulder piece and an additional energy box deep within its chest piece. These energy boxes are covered with multiple armor plates. The Boss uses two tank-like treads to navigate, connected to the chest piece with a relatively tiny hip joint. Large protruding shoulder-like structures are mounted on its back. The center of the chest armor includes an accent color piece reminiscent of the Sentry, where the Boss can generate a protective energy shield that prevents damage to the chest piece during the initial Boss battle.

[Character Sketch – Boss robot]

ENVIRONMENT

The environment is set within the canyon-valley shape of the robot **industrial complex**; some interior areas, some exteriors.

SECTION 1

The player begins the adventure in a relatively ordinary-looking interior hallway, facing the **opening doors to an elevator** with a picture window view of the valley expanse. Through the window, the player can see the scale of the valley, the high cliff walls lined with levels of industrial structures, and the floor of the valley is a buzz of activity, representing the robot army constructing, fortifying and organizing for continuous assault to unknown targets.

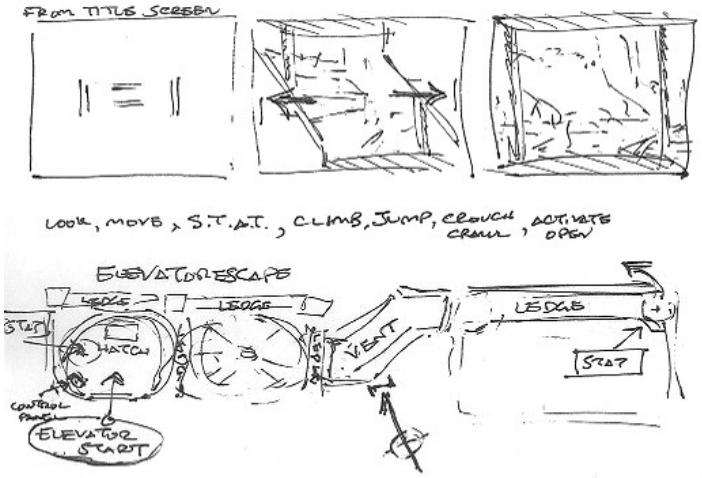
NO BUZZ OF ACTIVITY IN THE VALLEY COMPLEX IS DISPLAYED. NO MODELING OF THE FAR BACKGROUND VALLEY COMPLEX IS DETAILED; **ONLY OUTLINED TO INDICATE SCALE AND OVERALL SHAPE**. THE INTERIOR HALLWAY IS ONLY DESCRIBED IN THE IMMEDIATE STARTING AREA.

Elevator Shaft

The simple elevator car interior gives way to the elevator shaft when the player is prompted to escape via the ceiling hatch. The shaft stretches **dozens of floors in height**, and contains two side-by-side elevator tracks. The structure of the shaft includes large metal beams that support the industrial look, while providing the player a means, if hazardous, to reach the far side of the shaft to escape via vent opening. Utility lights line the walls, and red warning-like lights dot the metal structure.

NO OTHER FLOOR ACCESS DOORS ARE DISPLAYED. NO ADDITIONAL ELEVATOR CAR OR ELEVATOR SHAFT MECHANICS ARE DISPLAYED.

The ventilation ducts are low, and require the player to crouch while crawling through them. Vent fans spin in these **winding duct systems**, and hard shadow lighting can accent them.

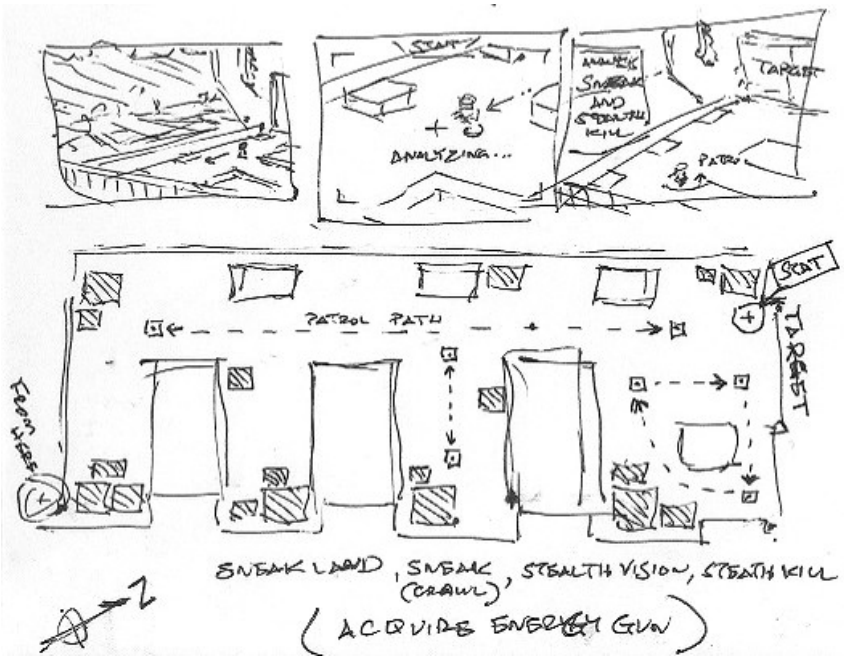


[Layout Sketch – Elevator Shaft, Vent, Catwalk]

Cargo Bay

Emerging from the vents, the player reaches an exterior catwalk **overlooking the valley complex** and a cargo bay with large blast doors on the far side. The loading area includes large open spaces with a railing overlooking the valley. The back side of the cargo bay is lined with large alcoves that separate storage locations for crates of various sizes, stacked and placed somewhat haphazardly. The far size blast door is next to more ventilation systems.

THE VIEW FROM THE CATWALK AND CARGO BAY RAILING **DISPLAYS NO DETAILS** OF THE BROADER VALLEY COMPLEX OR FAR BACKGROUND.



[Layout Sketch – Cargo Bay]

SECTION 2

The **player finds a way** into the second section via vent ducts.

Ventilation System

The duct system is consistently narrow, and has a number of vent fans, grates and side passages **the player can explore**. Vent fan openings overlooking the passage the player recently avoided reveal the fortifications robot security forces had in place.

Deeper into the vent ducts, the player reaches another vent grate that opens to a large computer server room, the security control room.

[Layout Sketch – Ventilation System] [Concept Sketch – Vent Access]

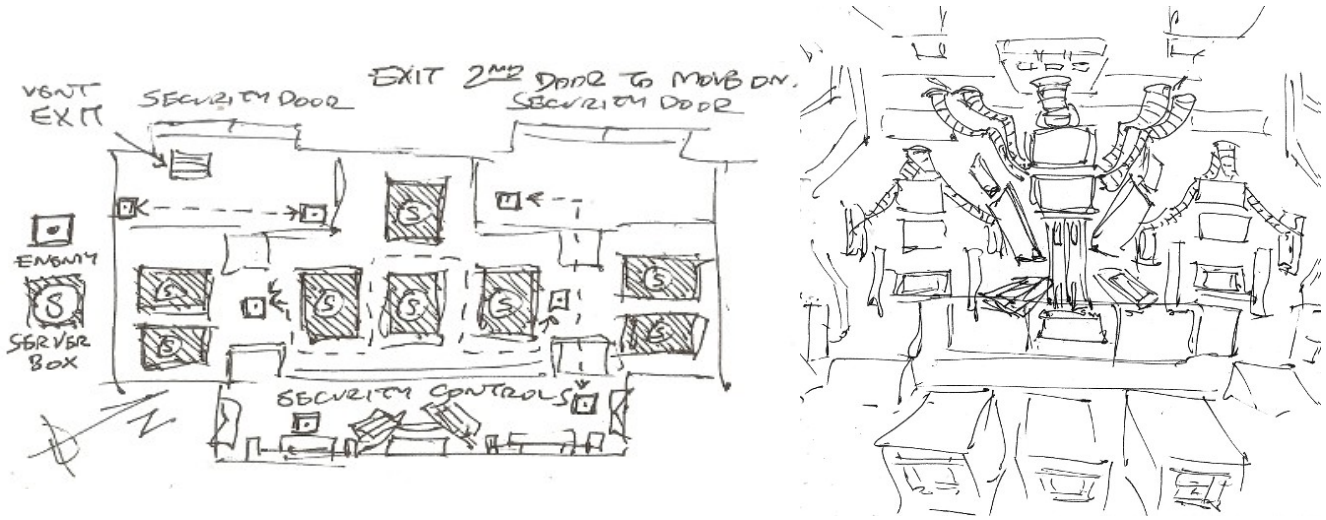
Security Control Room

The main feature of the dimly-lit security control room is **a massive control console** on the back wall, with multiple screens, control panels and flashy technical-looking components. This control console is situated within a raised alcove, with ramps leading up to it.

CONTROL CONSOLE LEVEL FEATURE ONLY DISPLAYS **MODEST DETAIL**, TO SUGGEST ITS FINAL COMPLEXITY.

The bulk of the room houses **an array of very computer servers**, spaced apart enough for adequate ventilation, robot sentry patrols, and player maneuvers. Additional raised platforms with simple ramps lead to the two blast door exits. There is also a tall ladder leading to another vent opening next to the far side blast door.

COMPUTER SERVERS ARE DISPLAYED AS **SIMPLE PRIMITIVE BOXES**.



[Layout Sketch – Security Control Room] [Concept Sketch – Security Controls]

Exit Detours

The far side blast door and tall ladder exits represent **a choice for the player**, and to approach section 3 in ways that either favor more stealth or more brute force infiltration tactics.

The blast door leads to **an angular space with a large glass wall** the overlooks the valley complex, and allows sunlight to highlight main blast doors to the observation deck that is section 3.

VALLEY COMPLEX AND FAR BACKGROUND ELEMENTS ARE ONLY **ROUGHLY OUTLINED.**

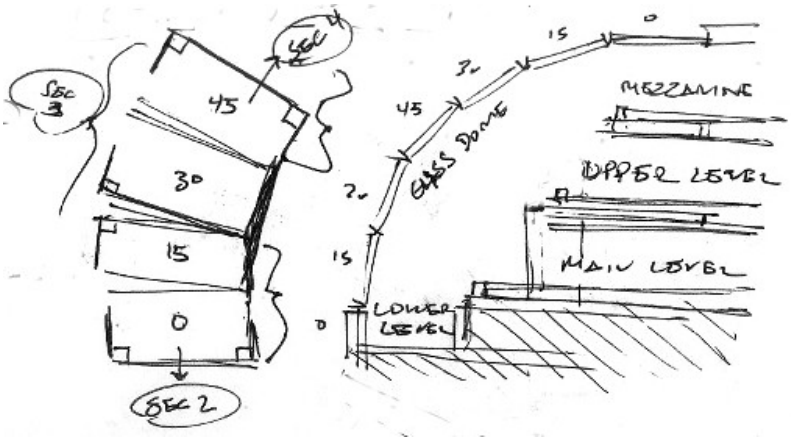
The ladder and vent opening leads to a maintenance area, larger than the vent duct systems; **a dimly-lit cramped space** and additional ladders that lead to a short vent connection to the mezzanine level of the observation deck in section 3.

SECTION 3

Given the two entrances to section 3, **the player will encounter different challenges** at the beginning of this level. The vent leading to the mezzanine deck provides a relatively stealthy perch, from which a plan for a stealth route can be planned. In contrast, the main blast doors open up wide to the main deck and reveal the robot sentry forces in plain view of the player.

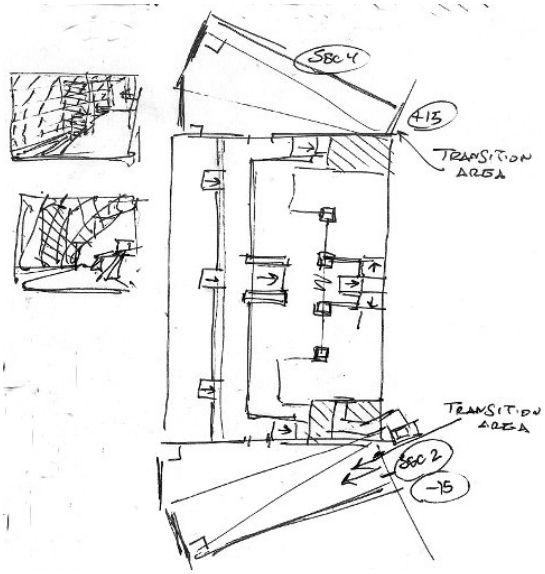
Observation Deck

This massive interior space is **dominated by a curved panoramic window** that provides an expansive view of the robot industrial complex. One prominent feature of this view is visible to the player at this point in the journey: the central command tower.



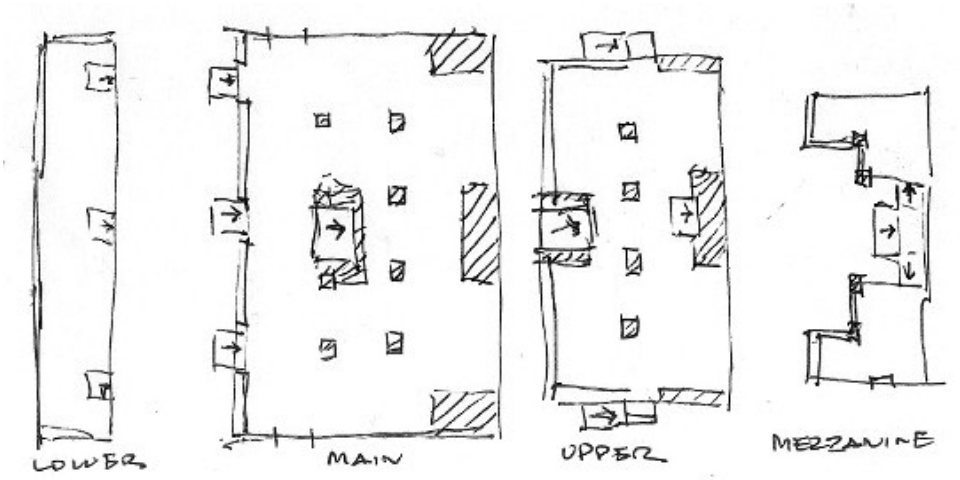
[Layout Sketches – Section Angle / Curved Windows]

VALLEY COMPLEX AND FAR BACKGROUND ELEMENTS ARE ONLY **ROUGHLY OUTLINED.**



The observation deck has **multiple deck levels** to provide a variety of altitudes and perspectives, as well as tactical pathways the player may use. These include a lower level against the window that is shaped like a

narrow trench, with multiple small lifts that give access to and from the main level. The main level includes the two primary blast door thresholds, a section near the back away from the window that is reminiscent of the darkness seen in the ventilation system, except wider and somewhat littered with crates. The upper level includes similar columns and a ledge overlooking the main deck, as well as a large lift leading to the main level, and another leading to the mezzanine level. The mezzanine level is a more narrow ledge hugging the back of this space, with a far-reaching view of the valley complex including the valley floor.



[Layout Sketch – Four Deck Floor Plans]

The large columns found here provide substantial support for the architecture as well as effective crouch cover during combat. The **lifts used here will respond to robot and player** maneuvers, including being “called” up or down when approached, and appropriately lift when ridden.

Ambush Point

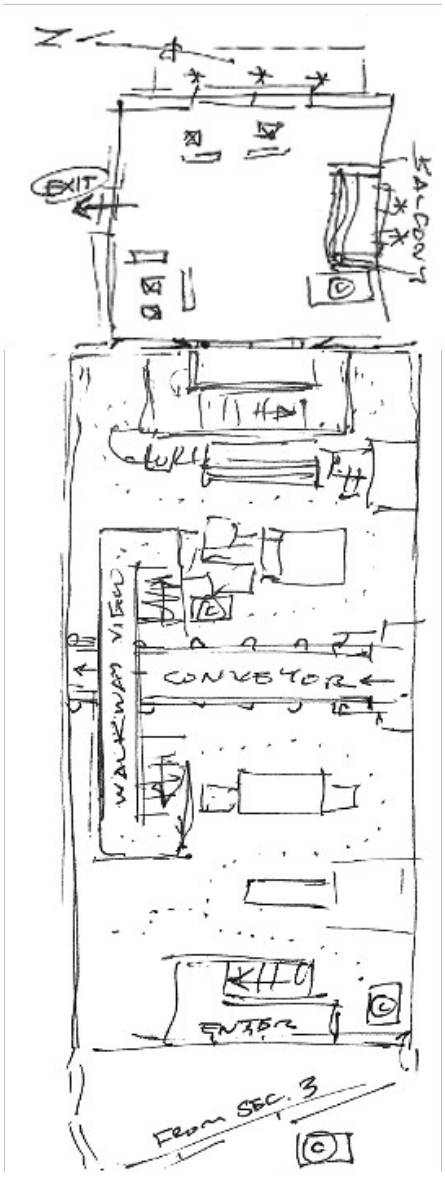
The far-side exit from the observation deck is on the main level. The main blast doors open to a twin angular window-lined area to that seen at the end of section 2. However, there are cover blocks, **crouch cover barricades designed for defensive combat positions**, placed to form a fortified ambush to surprise the player. This small angular space includes another blast door that leads to section 4.

SECTION 4

This section of the robot industrial complex is **a large, active factory** for heavy assault components. Multiple factory lines construct component parts from raw pieces with welding tools and somewhat chaotic machinery. Very large factory supply lines lead part in from above and one side to construct them on the expansive factory floor, while on the other side, large windows give a clear view of the command tower and reveal a new distinct feature ahead: a bridge leading to the tower, more than a few levels up from the ground floor of the valley complex.

[Concept Sketch – Walkway View of Tower Bridge]

[Layout Sketch – Factory Floor and Invitation Kill Box]



Factory Floor

The factory floor is **a single large and tall room, filled with active heavy machinery**, including a conveyor belt running across the middle of the floor, that carries a supply of energy boxes to other construction facilities below in the valley complex. This conveyor splits the room in two areas, the near side and far side. To traverse the conveyor, a long walkway spans it against the windows; which gives the player a clear view of the bridge to the command tower. The near side factory floor includes factory lines for tank treads and what will be used as the left and right arms of the boss robot enemy. The far side factory lines construct the boss chest part and twin compound guns. All these boss components are made from individual parts that appear to feed from supply line structures above the factory floor. All parts are welded together in place via a variety of novel manufacturing mechanics. The parts come together on palettes that glide along the assembly line, stopping for each stage of construction, and eventually disappearing to further construction facilities below.

THE MAIN COMMAND CONTROL TOWER AND BRIDGE ARE REPRESENTED USING **SIMPLE PRIMITIVES.**

As if the factory floor were not cramped enough, the entrance and exit to the floor include platforms and stairs with railings, the walkway over the conveyor likewise has staircases, and **multiple cover blocks** have been set in fortified defensive positions in the player's path to the exit. There are also distinctive piles of excess energy boxes, and a couple new prop features: energy recharger kiosks.

Invitation Kill Box

A switchback staircase leads from the factory floor up to **a large room situated at the entrance to the command tower bridge**. This large square room has a tall ceiling with large skylight windows that let in an angled shaft of sunlight. The entrance from the factory floor is an extra wide blast door, and a twin door is on the other side. The entrance to the bridge has a normal blast door, and the opposite wall includes a balcony with a similar blast door. Cover blocks are set in multiple places around the room, dividing this area into several defensive positions and relatively narrow spaces in-between. Two trap doors are set in the floor behind cover blocks in the near side corners. Under the balcony, there is an energy recharger kiosk set against the wall opposite the exit to the tower bridge in section 5.

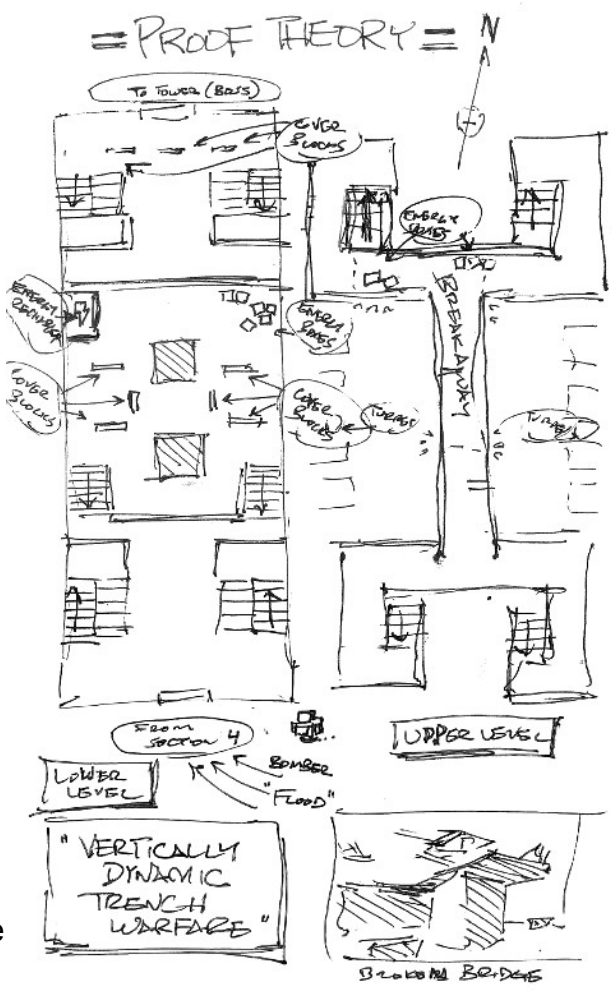
When opened the far-side extra wide blast door opens to a small **staging area for enemy robot forces**. Likewise, the balcony blast doors open to a smaller staging area for enemy robots. The corner trap doors will open to reveal rising lifts that carry robot reinforcements to a pedestal height.

SECTION 5

This is **the bridge to the main control tower**. It's a large structure with tall ceilings and a skylight that runs the length of the bridge, to provide strong angled sunlight, and clear view of the tower during the player's approach. The bridge in section five begins at the floor level, dips into a lower section in the middle, and rises again to floor level at the far side. This area is also divided vertically, with ground level fortifications and a long walkway high above.

MAIN COMMAND CONTROL TOWER IS REPRESENTED USING **SIMPLE PRIMITIVES.**

[Layout Sketch – Bridge Trenches and Walkway]



Bridge Trenches

Both the near and far ends of the bridge, at the ground level, have cover blocks set as fortified defensive positions and switchback staircases that lead up to the long bridge walkway. In the middle of the bridge there are far more cover block fortifications, set at multiple angles, which serve as boundaries of incremental tactical space to engage the enemy, as in **trench warfare**.

Additionally, the middle of the bridge includes two pedestals used to provide robot forces with a high ground ranged attack advantage. There are stairs leading from the near side to the middle ground, but no stairs providing access to the far side of the bridge from there.

Bridge Walkway

Switchback staircases at both ends of the bridge lead up to platforms that support an extra long narrow walkway high above the trench areas below. Due to the lack of stair access below to the far side of the bridge, this walkway is **the only structural access to the far side**. Along the walkway on either side, there are multiple alcoves. Nested within them, two small platforms are set against the walls that can provide a perch for ranged attack from enemy forces.

This walkway will collapse while the player is on it, and a large piece will slam down on a pedestal in the trenches below. This broken walkway can still be used for access to the far side, but will require the player to jump across from the broken part above.

Tower Entrance

This is a massive gallery that is dimly lit with a tall ceiling, and has huge columns near the four corners, like those seen in section 3. The far side of this room has a twin blast door. This otherwise an empty interior space suitable for **the final boss battle**.

LEVEL ELEMENTS

Features of each level are **important to convey the story**, player affordances, area hazards, tactical goals and enemy complex structural purpose.

ELEVATORS

Industrial elevators are **familiar reminders of large structures with intentional purpose**. These include compound elevator doors from the hallway and within the elevator car. The elevator cars glide along elevator shaft walls, and include escape hatches on the roof.

CONTROL PANELS

A consistent control panel design will be used for access to dynamic features of all kinds, from elevators, to blast doors, to computer systems. These are placed at chest height, have thumb-sized buttons and **small colorful animated displays**.

CONTROL PANELS ARE CONSISTENTLY DISPLAYED WITH A **CHECKERBOARD** GRID TEXTURE.

VENT ACCESS GRATES

Industrial ventilation grades can **slide up to open** and provide access to the vent ducts within. These are clearly open to airflow, and can provide some semi-obstructive view through when approached closely.

VENT ACCESS GRATES ARE DISPLAYED WITH A **CHECKERBOARD** TEXTURE.

VENT FANS

Within the ventilation ducts, various fans draw in airflow and push it out through the system. These fans are **encased with supports** for the fan and motor, which also blocks the player from passing through.

BLAST DOORS

These are **heavy dual sliding doors** that are installed as standard throughout the robot industrial complex. They provide a means to block access and lock to seal off entire areas.

BLAST DOORS HAVE **NO BAKED LIGHTING**, SO THEY APPEAR WITH NO TONE OR SHADOW RECEPTION.

STORAGE CRATES

These large metal crates hold a variety of supplies for the complex as auxiliary storage for future use. Because they contain a variety of materials, they appear in **a wide variety of sizes** and shapes, although always six-sided. These storage crates will be placed in a non-uniform way, mostly to give a clear visual indication that they are not part of permanent structure.

SECURITY CONTROL CONSOLE

This unique feature of the security control room in section 2 is **a complex of wires, tubes, panels, displays and a bank of blue blinking lights** to give the impression of active, powerful futuristic technology. The components of this feature are arranged symmetrically and include four main panel stations, with large control panels placed at waist height. Above the panel stations, there is an abundance of green-tinted displays of various sizes and shapes, angled down and around the control panel areas.

NO TUBES OR WIRES ARE DISPLAYED. ONLY **MODEST COMPLEXITY** IS DISPLAYED, USING PRIMITIVES.

SECURITY CONTROL SERVERS

These are **uniform large black boxes**, that more than anything else in terms of gameplay,

serve as cover for both stealth and combat. A modest number of blinking lights decorate one side.

NO BLINKING LIGHTS ARE DISPLAYED.

MAINTENANCE LADDERS

These are **climbable wall-mounted** ladders that provide access to higher ground.

SOLID PRIMITIVE SHAPE IS USED TO INDICATE BOUNDS OF THE LADDER.

COLUMNS

The columns found in sections 3 and 5 are **tall square blocks with substantial base pieces** that are just the right height for crouch cover.

LIFTS

These platforms are supported by a single vertical column that provides slow **hydraulic lift**.

COVER BLOCKS

Crouch cover structures that provide intentional tactical advantage for **fortified defensive positions**.

STAIRS, PLATFORMS AND WALKWAYS

The stairs, platforms and walkways are **strong structures with low railings** at crouch cover height.

FACTORY LINE ELEMENTS

On the factory lines of section 4, multiple mechanical components converge to **manufacture heavy assault robot components**.

Factory Supply Structure

These are **massive supply feed constructs** for delivering the individual parts necessary. They begin high above the factory facility and lead in to distribute the parts to the various factory line mechanics.

Factory Parts

Each individual part is assembled into a recognizable component of the final robot boss, including the chest, arms, guns and treads. Parts are **linked together in place on factory palettes**, and welded together by factory mechanics.

Factory Palettes

These are **simple flat platforms** to ferry the assemblages of heavy assault robot components. These palettes travel along factory lines by sliding and rotating as needed to position the assemblages appropriately for the factory mechanics.

Factory Mechanics

The factory mechanics are **intentionally complex, novel and substantially constructed**. Every station has parts delivered and the factory mechanics place these parts in position on the palette, and weld them together at various points on the surface.

ENERGY RECHARGE PAD

This is **a tall vending kiosk** that holds energy boxes at the top, and delivers energy along a charging arm, at gun level, to the player's gun. At the base of the kiosk, a large circular energy-colored pad serves as an invitation for the player to stand and trigger the kiosk to recharge. Additional blinking lights add attraction and indicate dynamic activity.

NO BLINKING LIGHTS ARE DISPLAYED.

[Image Sketch – Energy Recharger Kiosk]

PROPS

Game props include those things that the player can **dynamically use or encounter** in the levels.

S.T.A.T.

The **Surveillance and Tactical Analysis Tool** is equipment the player has acquired prior to game start. This device appears only via the Head-Up-Display, as either an in-level projection of position and angle markers, or as text on-screen that can serve story exposition, game instructions, or tactical assistance.

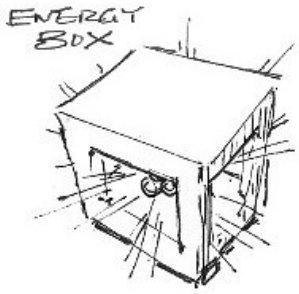
ENERGY GUN

This is an all-purpose gun that shoots projectiles of pure energy from **a simple hand-held barrel**.

A SIMPLE **PRIMITIVE SHAPE** IS USED.

ENERGY BOX

This energy storage unit is a cube-shaped metallic box that **magnetically suspends orbs** of pure energy. The orbs are suspended in such a way that they do not touch, but the energy is relatively easy to access, via and open cage-like construction.



[Image Sketch – Energy Box]

VISUAL EFFECTS

When things change, visual effect confirm for the player that **change in novel visual ways**.

WHILE MOST ART AND ANIMATION IN THIS PROJECT IS MINIMAL, THERE IS A STRONG NEED FOR SPECIFIC VISUAL EFFECTS TO **CONVEY DRAMATIC MOMENTS AND RESULTS.**

BEGINNING SEQUENCE

To begin the game, the **menu fades to black, with the exception of the game title** that remains. The player is shown a small banner that reads, “Initializing ...”, and a series of animated pixels that appear from the left and gather in the lower center of the screen to form three horizontal bars; a symbol know in mathematics as “definition” or “identical to”. This text fades to black, and the game title is left in place as the black background fades away to reveal section 1. A moment later, the title fades out. In addition, cheats are displayed, in a fade up and down.

PLAYER HINTS

Visual player hints take the form of level features whose materials **rhythmically pulse** the color of energy. There are hints that also provide instructions on specific player controls, such as “Press 'E'”.

CAMERA SHAKE

Given the player avatar is in first-person perspective, the camera shake effect is meant to support with **visceral emphasis of action and events**, such as damage to health, massive

object movement or structural destruction.

PAIN FADES

When the player takes damage to health, **a red, jagged overlay** appears to fade up and down briefly over the edges of the screen.

RESPAWN SEQUENCE

When the player loses all health, the respawn sequence begins with a simple fade to black, then displays a “Mission Failed” title overlay, before announcing that the gameplay is “Refactoring...”. At that time, a sequence of disjointed pixel-looking squares appear on the right and reassemble in the center of the screen in the shape of a definition symbol (a.k.a. “identical to” equals sign). **This mirrors the sequence displayed at game start.** All elements fade out, and the view returns in a fade from black.

STEALTH VISION

Stealth vision appears when the player is crouched. The player is able to see nearby enemies, even if there is no line of sight. The enemy robot parts appear as **a blue-ish white translucent overlay** the rendered frame.

ENERGY GUN PROJECTILE

The energy gun fires **a spherical shot that glows** the bright yellow color of energy.

ENERGY PROJECTILE TRAIL

The energy projectile leaves an energy trail as it travels. These are **bright sparkles of leftover energy** from the propulsion of the shot.

ENERGY PROJECTILE IMPACT

On impact, the energy projectile **bursts violently** into an area of individual bright points of light and energy. To emphasize the violence of the burst, these points begin fast and slow very quickly for contrast.

ROBOT EXPLOSION

When a robot character has lost all health, it explodes in a similar fashion to the energy projectile impact, but **much larger and brighter**. There are more points of light, a wider area

of effect and a longer lifetime to the particles.

SECURITY CONTROL CONSOLE LIGHTS

The security control console feature in section 2 includes a visual effect meant to indicate a very sophisticated artificial intelligence system that uses machine learning to improve security responses and counter measures. To convey this within a relatively static level feature, blinking lights are used. A large array of blue-ish lights blink in a wide variety of patterns, including random individual selection, toggle, every other light, all on or off, etc. The point is, **there is no discernible light blinking pattern** to the player. Once the player disables this control system, these light are disabled, and replaced by an array of smaller red lights that simply pulse slowly.

ENERGY BOX EXPLOSION

Upon being damaged, an energy box begins a **ramping up and overload of energy**, displayed as a material pulse with increasing frequency, while the inner suspended energy orbs begin to spin faster and faster. Upon reaching the maximum level, the energy box explodes in a manner similar to robot explosions.

FACTORY LINE SPOT WELD

When parts are placed and fixed to other parts, the factory machinery welds them together at various spots on their surface. This effect is composed of a brief, but bright, **flare center and a shower of sparks** and embers.

BLAST DOOR LIGHTS

These are **arrays of colored lights that border a blast door** to both indicate status of the door (locked or unlocked), and highlight the door as a feature of importance.

BOSS SHIELD IMPACT

The boss robot is equipped with **a circular energy shield** over its chest that is mostly transparent until impact. When energy gun projectiles impact it, the shield flickers a bright purple and emits purple electric bolts from the center of the chest. When the boss shield is disabled, the same purple color pulses briefly with descending amplitude until it disappears.

NO ELECTRIC BOLTS ARE DISPLAYED.

BOSS PLATE IMPACT SPARKS

When the boss robot is hit at points that are vulnerable to damage, armor plates will pop off, coupled with **a white-hot flare and a shower of sparks**, similar to the factory spot weld that attached them, but much larger.

BOSS PART EXPLOSION

When the energy box within a vulnerable boss part explodes, the entire part disassembles as a cascade, and **a very large flash and burst of energy**, with residual sparks and embers.

BOSS FINAL EXPLOSION

The last energy box explosion, from within the robot boss' chest results in the largest, **most violent and energetic explosion** of white-hot points of light, sparks, shards and embers.

END SEQUENCE

Reaching the final blast doors, once the robot boss is defeated, results in game end, with a simple fade to black, followed by what **at first, looks like another S.T.A.T. analysis**. However, this fades to black, and begins a brief fading slide show of the game credits, and the congratulatory slide, “Mission Success”, with the tagline, “Thanks for playing!”.

DEVELOPMENT MATERIALS SEQUENCE

From the main menu, once the option is unlocked, the player can view a simple **fading slide show sequence** of development materials. These concept sketches are shown as white on black drawings (inverted value), to match the black background of the menu system.

AUDIO

SFX

In general, sound effects need to **support the dynamics** of game elements.

Most of this project is silent at the White Box stage, with exception for special cases the player should focus on.

CHARACTERS

Character SFX **round out the player's understanding** of the game characters.

Player Avatar

The player avatar makes **only footstep sounds**. A handful of footstep, landing and jump SFX are used to support the player's navigation. No other sounds are made by the player avatar.

Robots

Robot Sentries, Bombers and Turrets make a variety of sounds to **indicate their behavior state**, including idle, alert, pain, death and win. Win is used if a robot adversary is defeated.

Boss

The Boss makes a variety of sounds to indicate **behavior states as well as movement** of its heavy frame. These sounds are more substantial, more mechanical and less electronic, and should convey heavy mass and slow thinking.

The robot Boss, for the most part, **makes no sound**. Other than explosion sounds on injury and defeat, the Boss is silent.

PROPS

Hand-held props use SFX to mark the points when they **activate or change**.

S.T.A.T.

The S.T.A.T. uses the game's interface beep as a **signal of new opportunity** for analysis, and during the stages of activation.

Energy Gun

Gun collection from a defeated robot is intentionally silent, to be a subtle indication of the player avatar's true nature. (see General – Story) Gun mode switch is a distinct **energetic crack and sizzle**.

THE ENERGY GUN COLLECTION AND MODE SWITCH IS **SILENT.**

Energy Box

If the energy box is damaged, this triggers a ramping up of energy over a short time with **loud ascending humming**. The energy box explosion is similar to other explosion sounds.

LEVEL DYNAMICS

A selection of dynamic level features benefit from sound effects that **match the event, action or change**.

Blast Doors / Trap Doors

Blast doors and trap doors slide with **hydraulic and mechanical** locking / unlocking sounds.

DOOR MOVEMENT IS **SILENT.**

Elevators / Lifts

Elevators use mechanical motor sounds to move. Lifts use a combination of **hydraulic and mechanical sounds**. There is a hazard event of a second elevator speeding past the player after they've made progress in the elevator shaft, and this elevator rumbles past to help indicate the speed, power and danger of their circumstance.

LIFTS ARE SILENT. THE **ELEVATOR IN THE BEGINNING** USES A DELIBERATE MOTOR SOUND DURING DESCENT IN ORDER TO CONTRAST THAT WITH A SHUT DOWN OF THAT MOTOR SOUND.

Control Panels

Control panels respond to player activation with **a series of key press sounds**.

CONTROL PANELS ARE SILENT WITH ONE EXCEPTION: **THE SECURITY CONTROL CONSOLE PANEL**, IN WHICH THE PLAYER IS DIRECTED TO HACK.

Hatches / Vent Covers

Hatches and Vent Covers slide open with a **simple, muted hydraulic sound**.

OPENING VERT COVERS AND HATCHES **MAKES NO SOUND.**

Vent Fans

Vent fans hum with a localized **electric motor** sound.

VENT FANS ARE **SILENT.**

Security Control Console

The security control console in section 2 has **a slow pulsing hum** that is heard from a short distance away. At the time of the console shutdown event, this switches to a run down sound effect.

Energy Recharge Pad

The energy recharge kiosk, once activated, emits a **strong energy charge** sound, similar to the energy box overload ramp up, but with a second tone that descends to balance out the tension.

Factory Line Mechanics

Factory line mechanics will emit **a variety of mechanical, hydraulic, spark and ratchet sounds**. Together on the factory floor, the intent is for a cacophony of chaotic noice to match the visual activity of the factory lines.

FACTORY LINE MECHANICS ARE **SILENT.**

Walkway Collapse

The walkway collapse event found in section 5 will be **a dramatic composed sound event** that begins with metallic groaning and creaking, followed by structural shearing, punctuated with moments of silence, and finally a dramatic, complex crash of metal pieces from small to very large.

THE WALKWAY COLLAPSE MAKES **NO SOUND.**

EFFECTS

Visual effects are made more **substantial by coupling** them with sound effects.

Energy Gun Fire

Firing the energy gun and launching a projectile creates a **concussive** sound effect.

Energy Gun Projectile

The energy projectile travels through the air and emits **a localized hiss**.

Energy Gun Impact

An energy gun projectile impact explodes with **an energetic boom**.

Robot Explosion

The robot explosion is similar to the energy gun impact, but **bigger**. Robot parts that land after flying apart should made metallic thud sounds.

ROBOT **PARTS MAKE NO SOUND** UPON LANDING.

Boss Shield Impact

The Boss shield uses pure energy, and to convey that on impact, this feature makes a **crackling electric sound** that trails off after impact.

THE IMPACTS ON THE BOSS CHEST SHIELD IS **SILENT.**

Boss Plate Impact

Boss armor plating are the more vulnerable points of the boss robot. When impacted, a **distinct clang sound** of various pitches will be heard. When the plate piece has taken the maximum damage, a larger sound is made to couple the visual explosion effect that pops the armor off the robot's frame. Like the robot parts, boss plate make a metallic thud sound when landing.

IMPACTS TO THE BOSS ARMOR PLATES **MAKES NO SOUND.**

Boss Part Explosion

The boss destruction of arms results in a **very energetic explosion** that tops the standard robot explosion.

Boss Final Explosion

A faintly discernible **electronic death cry** beep from the robot boss should be mixed in with a more substantial explosion sound, as compared with the boss part explosion.

THE FINAL BOSS EXPLOSION SOUND EFFECT IS THE **SAME AS THE BOSS PART EXPLOSION.**

USER INTERFACE

Players are **reassured of system's response** to their actions when SFX are used.

Menu

There is a single **simple electronic beep** sound used for all menu feedback.

MUSIC

Music is used to **dial in the emotional target** the player should feel in the moment.

NO MUSIC IS USED.

TONE

This action-adventure title centers on **drama**, and contrasts of player emotion.

PROGRESSION

We rely on music to begin with where most players are emotionally, anticipating but uncertain. **Exploration will give way to tension**, which will lead to a release of urgency for quick thinking and player action.

The rhythm of gameplay pace includes mystery and anticipation, followed by tension and high action, to then be resolved by more calming relief. At times when surprises are encountered, these provide additional opportunities to punctuate the adventure with **musical stings**.

VOICE

No voice audio is used in this game.

DESIGN

PRIORITIES

Design priorities will **focus** the development efforts to address the most important needs.

1. Action gameplay
2. Adventure gameplay
3. Puzzle gameplay
4. Storytelling
5. Game Art
6. Game Audio

STORYTELLING

The success of storytelling helps to **orient the player** to the setting, characters and challenges.

S.T.A.T. ANALYSIS

The Surveillance and Tactical Analysis Tool will be introduced to the player as a helpful accessory and guide to help them avoid danger and head toward affordances. While the analysis provides this information to the player, it will do so in the vernacular of the game world, including descriptive details that serve as **a thematic narrative device**.

ENVIRONMENTAL STORYTELLING

Features of **the environment can provide context** for the narrative of the adventure, including aspects of the robot industrial complex that indicate their long-term plans. These features can also serve to highlight the idea that the player avatar is infiltrating an established base with substantial forces set against them. This helps to convey the player's dramatic adventure.

PLAYER ACTION ADVANCEMENT

As the player completes goals, their actions will result is a response that affirms their goals were achieved, their actions were significant and their involvement in the game world is

having an effect. The actions and decisions of **the player make a difference**.

SURPRISE EVENTS

As the player begins to understand and predict the game systems, that enemy characters and the game world in general, surprise events can **shake up their experience** and focus their attention, for further engagement and immersion.

USER INTERFACE

The two components of the user interface, the player input and the system feedback, need to be as **clear and direct** as possible. This involves a primary tactic of consistency.

PLAYER CONTROLS

As a browser-based platform, the WebGL build takes advantage of desktop input to perform a very traditional FPS computer game. **Keyboard and mouse** player input will match the convention these core desktop gamers expect.

[Chart – Keyboard and Mouse Controls]

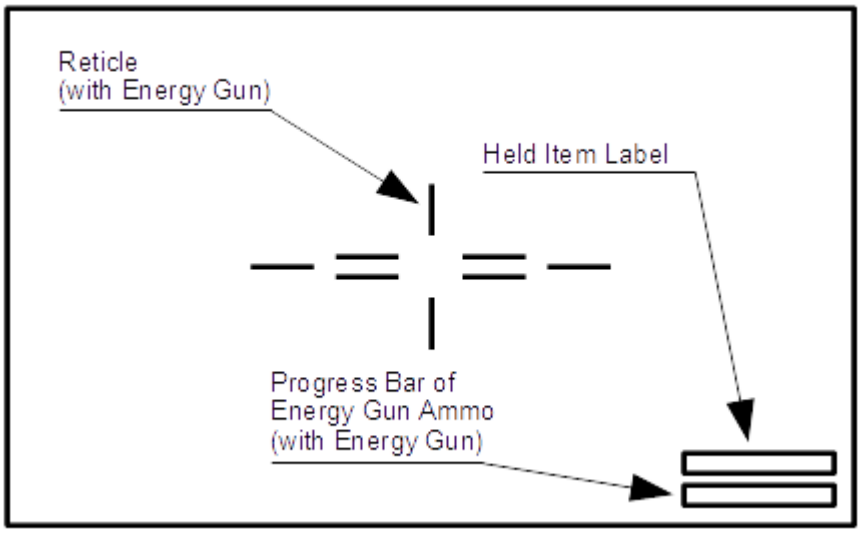
SYSTEM FEEDBACK

The browser is able to provide traditional **stereo audio and a viewport** display directly on the web page. The viewport display is 960x600 pixels, a 16:10 aspect ratio. Although the WebGL build offers a full screen option, this is unpredictable, as it depends on the end-user's display hardware, and may result in a stretched display that distorts the intended proportions of the game.

HEADS UP DISPLAY

Within the game, a Head-Up-Display will overlay the rendered image in the viewport, and offer the player additional **information important to their available actions**.

The primary element on the HUD is the **held item information**. The player will begin with the S.T.A.T., and later acquire the Energy Gun. When the Energy Gun is acquired, its HUD display will include a crosshair reticle and a progress bar indicating the energy level used as ammunition.

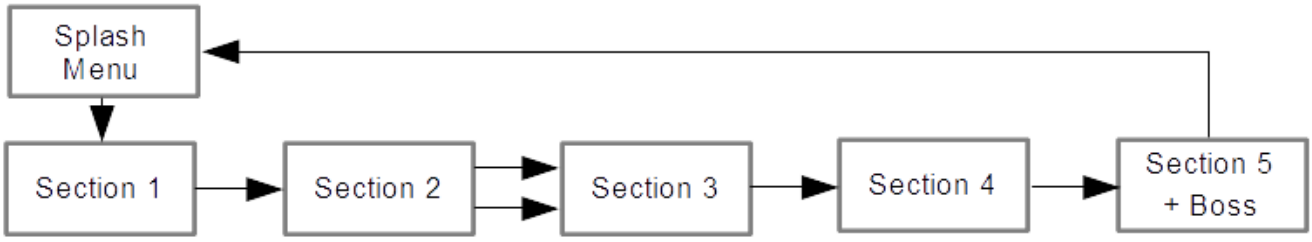


[Wireframe Image – HUD layout]

The **S.T.A.T. display takes over** when activated, leading the player to a navigation point, a viewing angle, and to activate the surveillance with a button click. This will result in a display of the resulting tactical analysis the player can read and then disable afterward with another click.

MENUS

The **simple menu system** takes the form of a black background and centered text in the same font and color as the rest of the interface, for consistency. Button clicks respond by toggling to sub-menu screens and back, and by sounding a simple electronic beep.



[Chart – Game Flow Menu System]

CHARACTER DESIGN

The design of the game **characters reflect change** that this game world will go through as the player engages the challenges and progresses through the story.

PLAYER AVATAR

The player character avatar is **not shown on screen**, and the player perceives the world from the eyes of this character in a first-person perspective. The only feedback that indicates that nature of this character will be the audio of the footsteps, played during movement. The held energy gun the player will acquire is the only visible element that connects the player avatar character to the game world.

The player avatar can **walk, run, jump and crouch**. When crouched, the footsteps are not heard, and the player is considered in stealth mode.

Stealth mode allows the player to evade robot audio detection, and provides the player with stealth vision. Stealth vision is an overlay to the viewport that will show enemy robots that are nearby, as a translucent blue-ish white “x-ray” version of their normal display.

The player is also **able to activate** or otherwise interact with level elements by using the action button “E”. This action button can open doors, vents and hatches, as well as activate control panels and launch hacking of those facility systems.

Physics of the player character avatar will closely match reasonable expectations players may have about **normal physics** in this game world. In general, the speeds, dimensions, proportions and other physical attributes will match those of the robot Sentry characters. This is intentional.

ROBOTS

Non-Player Characters are **hyper-dynamic level elements**. As such, the robot enemy characters function as active challenges for the player to overcome, and as examples of the entities that built, maintain and otherwise function within the game world presented to the player.

Robots in this game are **made of block shapes**. The angular shapes used in the robot designs include a block-shaped head with a flat display for a face. The face display is common among all robot types. The face display features three symbols that change to reflect the state of the robot mind, including idle, alert, combat, pain and death.

Likewise, all robot types except the Boss character are **able to angle their view pitch** up and down, and when they do, the individual pieces will adjust their position and angle. These robot types are also able to roll smoothly for movement, jump short heights and spin in place abruptly to turn.

All robot types have the **ability to see and hear** the player, given they have effective radius distances to see and to hear. When the player is detected by sight or sound, they become alerted, as shown by a flashing alert icon effect over their head. Alerted robots will suspend any guarding or patrolling routines they are engaged in.

Alerted **robots are able to hunt for the player**, using their last known location either by sound or sight, as a target location to search. They are able to organically navigate their

immediate surroundings, regardless of level dynamics or hazards, and discover the player.

Robots can become more alert until they are fully alert, which is attained in combat or in direct line of sight of the player. **They can become less alert over time**, if the player is not detected. They also have effective view angles that limit when they are able to see the player, which makes them vulnerable to stealth kills.

All robot types except the robot Bomber and Boss have a hidden **kill switch on their back**, placed in the center of their chest piece. This appears as an over-sized sliding mechanical switch that fades up if the player is both in stealth mode and in a position close to and behind the robot. At that time, the player may activate the kill switch, and perform a stealth kill, with the action button “E”.

Robots **can be engaged in guarding routines** that lead them to a specific location navigate to, and a specific location to look at. Likewise, robots can be engaged in patrol routines, which is effectively a series of guarding positions and views to cycle through over time, and with a potential for delays. Regardless of guarding or patrolling routine engagement, any robot will periodically look around, and potentially move around as if to wander, if set at a guard or patrol point for more than a few seconds.

Sentry

The robot Sentry is a **roughly humanoid** construct, or android, with a roller ball in place of legs, for propulsion, and a single gun barrel in place of their right arm. The chest is made of a large blocky shape with a bright panel on the front.

The Sentry is able to crouch as well as jump, and they can **use crouch cover effectively**.

Sentries will reserve their energy gun ammunition until needed, and may fire at a rate of nearly 4 shots per second. Sentries will fire as long as their gun has energy and the barrel has a direct line of sight to the player. The Sentry **fires using the “long shot”** gun mode, with a larger shot that does more damage, at a larger cost of energy.

Sentries are able to dodge incoming fire, find effective cover, or close (or charge) the player, which makes them **particularly effective in open-area combat**.

Bomber

The robot Bomber is a short version of the Sentry, without its chest piece or hip piece. Instead a smaller **head and roller ball are connected to a half-sized energy box** for a body.

This robot type is designed for melee combat, in a kamikaze style. They will approach the player as normal, but then will more often elect to ignore all other impulses and **charge the player directly**. Once the Bomber has reached a close distance to the player, the energy box is activated, as if it were damaged, beginning a ramp up of energy that will eventually explode, destroying the Bomber with an area of effect damage.

All other dynamics associated with the energy box the Bomber has will apply as normal, including any **chain reactions** or simply being damaged by an energy gun projectile.

Turret

The robot Turret is a type that closely resembles the Sentry, with two major differences. First, the Turret is **significantly thicker**, with a larger chest, hip and should piece. This correlates with the 2.5x health rating robot Turrets have, as compared to Sentries.

The second major difference is the Turret energy gun is mounted just under its head, and centered, as if if were mounted to its chin. The energy gun it fires is set to the **“Rapid Fire” gun mode**, which fires at a higher rate, and at a lower ammunition cost per shot. However, each shot is smaller and does much less damage on impact, as compared to the “Long Shot” gun mode.

Most importantly, the Turret is **does not move** beyond rotating in place and angling up or down.

Boss

The robot Boss character is **an entirely different design**, although the same materials are used, and one part in particular, the head piece, is identical to the Sentry.

The robot Boss is constructed from the **heavy assault components** used in section 4 – Factory Floor.

Instead of a roller ball for locomotion, **the Boss uses twin treads** join to a pivot point at the top. From this pivot, the massive chest piece can spin to turn and face another direction. Two large shoulder pieces are fixed the the chest, and the quad-gun parts can angle from those elbows to aim down from straight ahead.

With these large parts to move, the Boss is made to be heavy and well-armored, but not agile or quick. As such, the Boss must move by first rotating its treads to be in line with the target location, then it can move forward or back in a straight line. Separately, the Boss chest piece, with its arms and gun attached, **can spin on those treads to face another direction**. The Boss can turn all 360 degrees from its treads, as needed. The head piece is fixed to the chest as well, and that dictates the Boss' facing direction for purposes of sight detection of the player.

As mentioned above, **the arms each carry quad-guns**, four normal energy gun barrels fixed to a main barrel. These gun face directly forward, in the direction the chest is turned. Further, they can be angled down slightly to aim to the player if closer to the Boss. When fired, the Boss selected a gun mode in a non-repeatable way, among three modes: “Twin Fire”, where both guns have a synced barrel fire at the same time, “Alternating Fire”, where the synced barrels are offset to fire alternately, and “Burst Fire”, where all four barrels fire in both quad-guns at once. The energy consumption and restoration of these gun barrels are normal. The quad-gun barrels are all set to “Long Shot” gun mode, as robot Sentries have.

The robot **Boss has heavy armor plating** affixed to its parts that protect energy boxes that power it. Each shoulder piece is a protective box with armor plates covering an energy box powering its quad-gun. The chest piece is a heavier box with more armor plates covering a

third energy box that powers its locomotion. These armor plates keep incoming energy gun projectiles from setting off the energy boxes, however, these armor plate can be damaged and destroyed. As the become damaged, one-by-one, these armor plates will pop off, eventually leaving the energy box they cover exposed. This is how the Boss is defeated.

Once shoulder piece energy boxes are damaged, and explode, **the entire arm assembly will explode apart**. This means the robot Boss can be left with just one arm, or no arms.

Until then, however, the chest armor has an extra layer of defensive protection, **an energy shield** that's also powered by the energy box inside. This is a translucent energy shield that flashes bright when deflecting incoming energy gun fire, keeping the chest armor plates entirely protected. Only when both robot Boss arms have been destroyed does the energy shield covering the chest fade out and become disabled. At this point, the Boss's chest armor plates can be damaged and destroyed like the others, eventually leaving its final energy box exposed.

The Boss is not defenseless while it has no arms. Instead, **the Boss is able to fire a jet of energy projectiles directly from the energy box in its chest**. The fire mode of this jet is the “Rapid Fire” energy gun mode, and the same “Twin Fire”, Alternate Fire” and “Burst Fire” mode selection rules will apply, although much faster.

Once the final energy box is damaged, and explodes, the entire chest assembly explodes in a massive explosion, leaving **the Boss destroyed and defeated**. This triggers the exit doors of the Boss battle, to allow the player to trigger the end game sequence.

The Boss hearing and sight radius is comparable to other robot classes. It's field of view is a little more narrow, at 60 degrees ahead. The **biggest difference in behavior is its reaction time**. The Boss acts and reacts in intervals between 2.5 and 3 seconds, which is far slower than the other robot classes. This gives the player some advantage to overcome the size and speed of the Boss. It also provides a means to evade the Boss long enough to duck out of sight and hearing range, to take advantage of stealth skills the player has acquired. The robot Boss will become alert to the player when seen or heard, and begin to lose its level of alert when not, losing track of the player and switching to patrol mode within 6-8 seconds. The Boss' gun aiming is likewise subject to this slow reaction time.

The Boss **will turn to, then move to, the player location**, if known, or the last known location, if not. The Boss will revert to a patrol mode is its location if it has lost the player entirely. This patrol mode selected between several points in the room, and travels to them, with a variable interval in-between of about 6-12 seconds.

LEVEL DESIGN

The level design of the game world **brings together all other aspects** and implements them as an interactive system that the player engages in.

SECTION 1

The beginning of the game **introduces the player** to the environment, their abilities within the game, and their agency to interact with the elements they find along the journey.

Progression

Giving the player a means to **understand and practice their standard abilities** is the highest priority. The player is afforded a calm, recognizable space to reference the controls, and try out their movements, including walk, side-step, run, jump and crouch. This may happen as soon as the game begins, in the entry hallway, or it will be necessary to progress soon afterward. The entry space elevator will immediately lead the player to the S.T.A.T. for the first time, setting up its consistent rhythm for the rest of the game. The player will need to activate a control panel, open a hatch, climb, jump and crouch soon after that. By the time the player has encountered an enemy, they will have to had exposure and practice with these controls, and an understanding of how they can be used in the environment.

Along the way, multiple safety measures are in place to ensure the player will progress, including hint routines to pulse the elevator control panel and elevator escape hatch, and a checkpoint to respawn the player at the edge of the elevator shaft, if they fall. The idea is to **efficiently help the player understand how to use the game controls** with practice and mild challenge until they succeed.

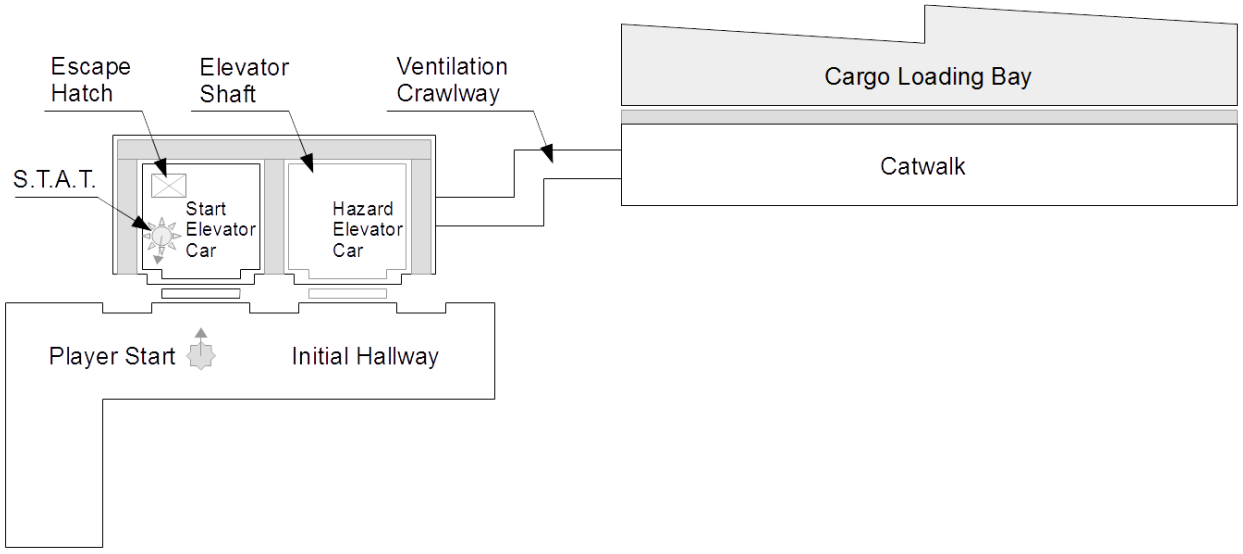
The S.T.A.T. tool will be able to explain to the player what to expect from the first enemy encounter, and further, **provide instructions for performing a stealth kill**, one of the more advanced actions. Additional S.T.A.T. help will activate if an amount of time has passed without performing the stealth kill, including hints on waiting out of sight, and timing their approach to the Sentry robot. Until the stealth kill is performed, the player will be only equipped with the S.T.A.T. and their stealth abilities. After the stealth kill, the player will acquire the energy gun.

Once the energy gun is acquired, it will remain the primary hand-held tool for the player, which sets up **ranged combat between the player and the three Sentry robots** in section 1. Importantly, these robots are spaced far enough apart that the player can easily engage with them one-by-one, making the first combat engagement easier to manage.

The last step for the player in this section is to use their knowledge of the elements of the game world to figure out how to proceed when the obvious means to move on, the blast door, is locked. The player will have as much time as **they need to combine exploration, jumping, opening and crouching** to get into the complex's ventilation system, and progress to section 2. After a time, a hint routine is provided to help the player.

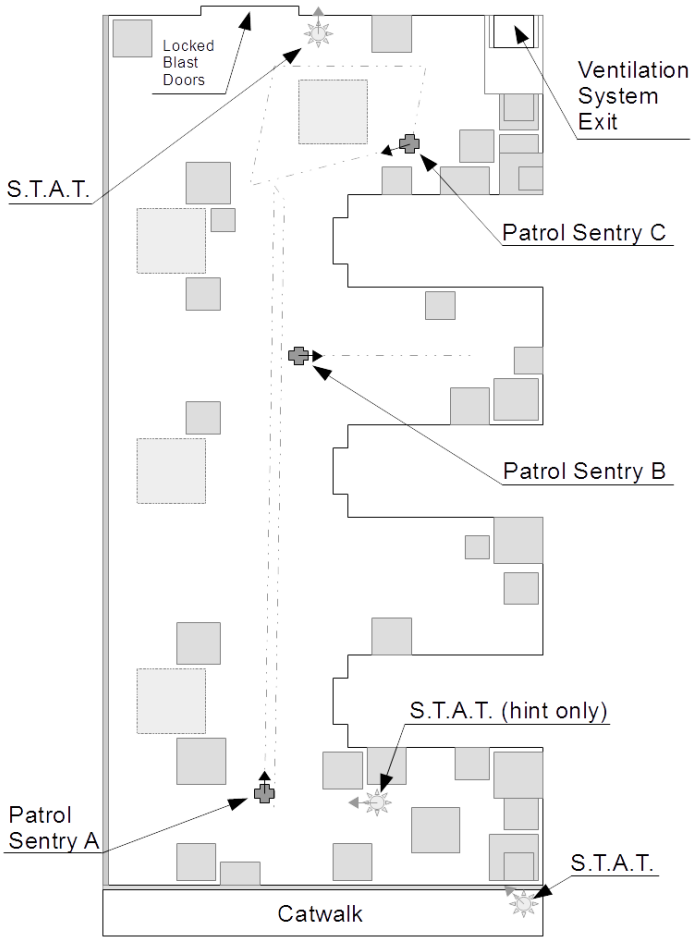
Layout

The layout of section 1 is divided in two main parts: **the elevator shaft and the cargo loading bay**, with a short ventilation duct passage in-between.



[Layout Map – Elevator Shaft, Vent, Catwalk]

[Layout Map – Cargo Loading Bay, Blast Doors, Vent Exit]



Features

The largest feature of section 1 is **the vast robot industrial complex landscape** shown in the background from the moment the elevator doors open to the glass on the back of the elevator car.

The beginning **elevator car** is able to perform the typical operations, including doors opening, closing, elevation, as well as the escape hatch that can open for the player. Another elevator car is used in the elevator shaft as a surprise event that appears as a significant hazard.

The ventilation ducts include **a simple fan**, highlighted with a spotlight and dynamic shadows.

An open-air catwalk provides the player with a clear overhead view of the cargo loading bay and the broader complex environment, emphasizing the size and height of the canyon valley shape.

The cargo loading bay meant to serve as a combat area that is big and open enough to take on the initial enemies one at a time, while also provide **a variety of cover options** for both stealth maneuvers and defensive combat tactics.

The large blast doors at the end of the cargo loading bay introduces the player to this consistent feature of the complex, even if it is locked and inaccessible. The exit through the ventilation system sets up **the overall stealth approach is going to be a primary tactic** for section 2, and beyond.

Player Action Result

The first reaction the game world gives the player, in response to stepping onto the elevator, is essentially a slow-motion trap being sprung, an ambush waiting for them, causing the S.T.A.T. to alert the player to immediate danger, and brief instructions to make an impromptu escape. The player's first series of actions propels them to defy expectations, and **make their own way forward in secret**.

Continuing the stealth theme, the player's next major action is to perform a stealth kill against the enemy, and acquire an energy gun. After that initial stealth kill, the player cannot progress without dispatching the other two patrolling robots. This is meant to **cement the primary conflict in the game**, between player infiltrator and robot defenders.

SECTION 2

With the player somewhat acclimated to the game world, the enemies and player abilities, section 2 has a primary purpose to **test the player**.

Progression

Beginning in the ventilation system, the player is automatically crouching and in stealth mode. The movement through the vents are meant to **demonstrate the fortified defenses** that were avoided by using these ducts, as opposed to the blast door exit from section 1.

Exploring further into the ventilation system, the player will eventually arrive at the security control room, where the S.T.A.T. analysis explains the **opportunity to disable primary defensive routines** if the player can make it to the room's main control panel.

The security control room has **four Sentry robots patrolling and guarding** in various places with the added complication that they can see each other at times. This makes either a brute force or stealth approach more difficult. However, two of the four robots are placed and guarded in such a way as to allow stealth kills easier.

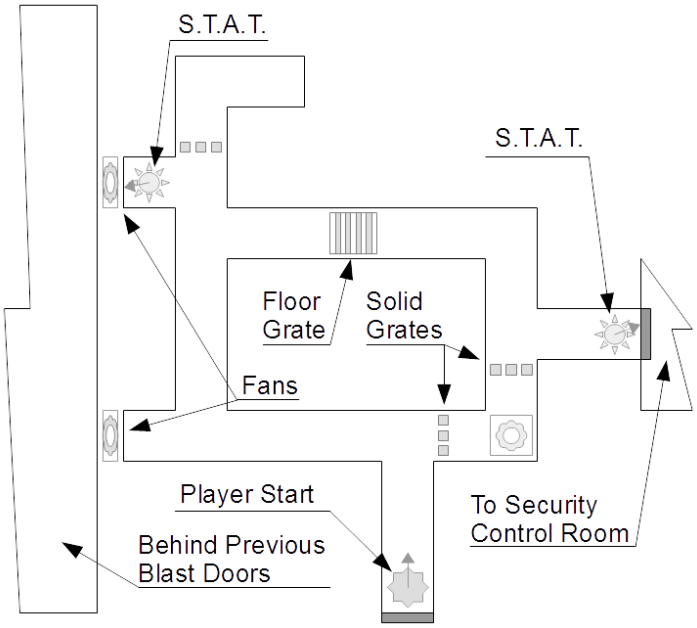
In addition, the room is filled with **several large servers** that can be effectively used as combat cover or a means to use stealth easier against the robots. Robots may be engaged by stealth or open combat, or a combination of both, as alerted robots will hunt the player among the servers, and provide opportunity to sneak up behind.

Once the robots are defeated, the S.T.A.T. will lead the player to **hack the main control panel**, sabotage the complex defense systems and then progress toward section 3. Story-wise, this is also a time to introduce a hint that machine learning is a major part of this adventure, even if it is not explicitly described as possible for both robots and the player's mission.

The last S.T.A.T. analysis explains **there are two routes to enter section 3**, one is more direct and one is through a maintenance tunnels above. The player is free to choose which route to take, and arrive at section 3 from a separate entrance.

Layout

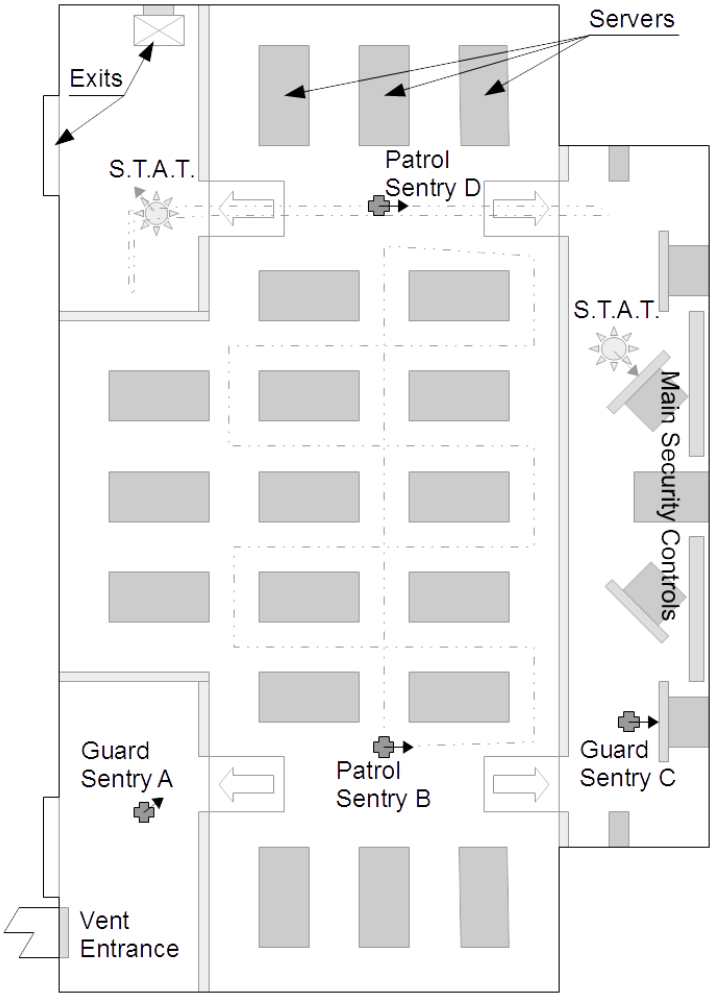
Section 2 includes the initial **ventilation ducts, the main security control room and the two exits** toward section 3: a maintenance ladder leads to small tunnels and a vent above, and a short entryway on the main floor leads to blast doors.



[Layout Map – Vents]

[Layout Map – Security Control Room]

[Layout Map – Maintenance Tunnel and Main Floor Entryway]



Features

The ventilation ducts early in section 2 feature multiple fans and grates to limit the path forward for the player. Beyond two of the fans, the player is able to see **an open area below where multiple robot Sentries patrol**. A small grate in the duct floor reveals a normal passage toward the security control room. Sunlight can be seen casting a shadow of a fan beyond one grate, the vent system continues on beyond another.

The security control room has one big main feature, **the main control panel**, a massive complex of screens and control panels, on the far side of the room from where the player enters.

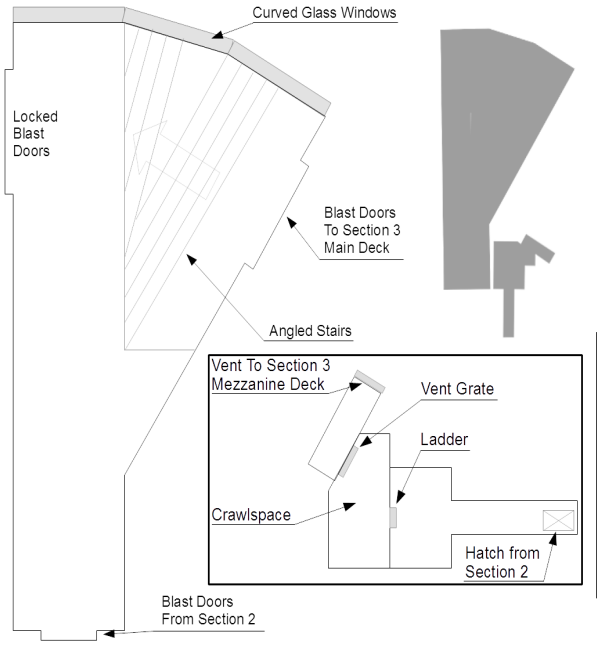
Banks of large computer servers are arranged in orderly formation on the security control room floor, with ample space between them.

A maintenance ladder leads up from the platform at the other end of the security control room, and to a hatch in the ceiling.

Twin blast doors are situated in the room, one locked under the vent the player enters, and the other close to the maintenance ladder on the other side.

The maintenance tunnel leads to **a small room with another short ladder**. This ends in a vent grate, and on to one entrance to section 3.

The exit blast doors lead to **a large angular room with large skylights** and windows overlooking the complex, with blast doors leading to the other entrance to section 3.



Player Action Result

The player has reached the main security control room with the robot forces unaware. Whether via stealth or brute force, the actions the player takes from here dramatically effect the progression of the combat engagement. The player will primarily learn **their choices matter**.

It is very likely that the player will have to **face more than one enemy** Sentry at a time during this engagement. This situation allows the player to learn how that can complicate combat.

Hacking the primary controls for the main security system will be a significant event, punctuated by sounds and effects. The S.T.A.T. further explains that this action will prevent robots from calling reinforcements as normal.

As presented by the S.T.A.T. before leaving the security control room, **the player will make a choice how to proceed** from here and how to engage the enemy in section 3. This results in the player reaching section 3 in distinctly different locations, offering separate affordances and challenges. This also promotes a point the player may want to replay.

SECTION 3

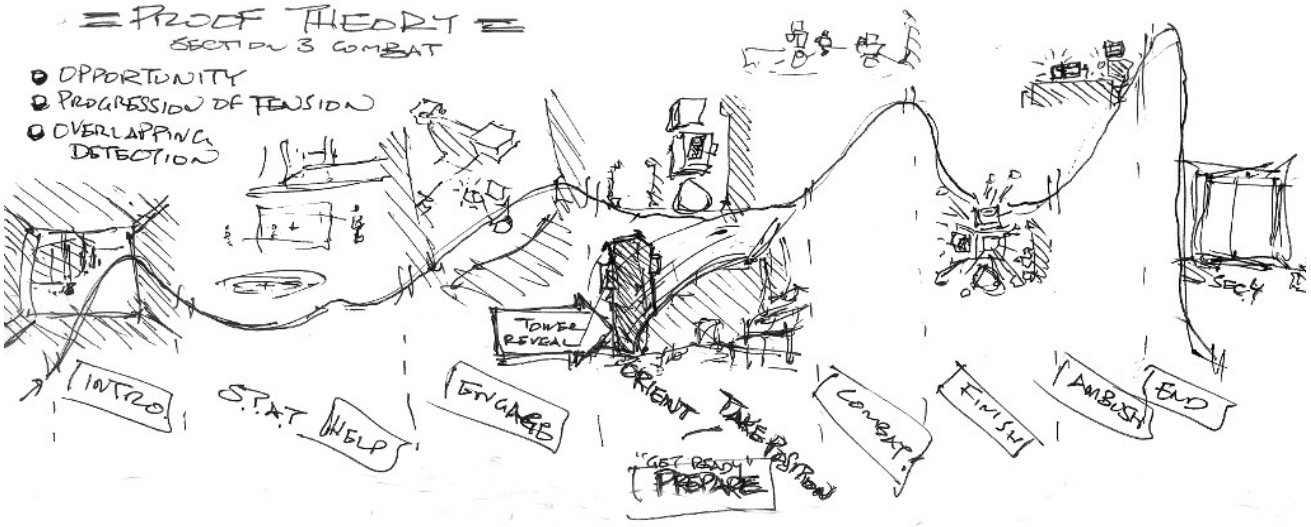
Section 3 offers the player an opportunity to **explore tactical options and plan** their route ahead of time.

Progression

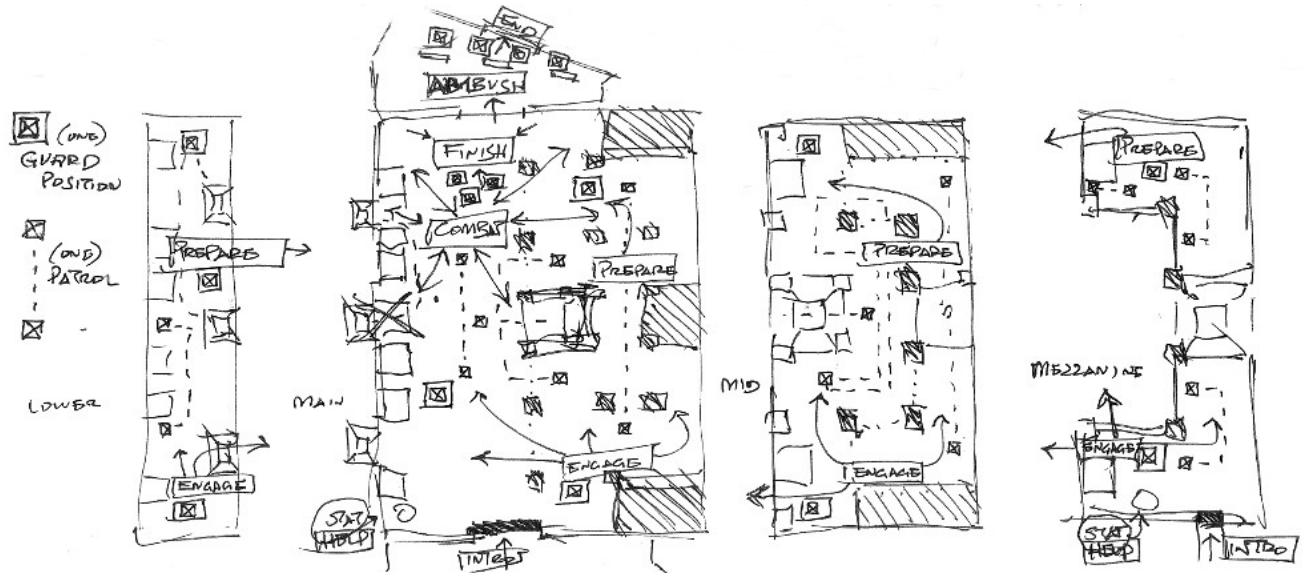
The player will either appear in this location from above, in the vent just above the mezzanine deck, or on the main deck, through the primary blast doors. Their **section 2 route choice determines their entry point**.

If entered from above on **the mezzanine deck**, the S.T.A.T. appears there, behind a few crates, providing an opportunity to learn about the energy box hazard, and a further warning that the player should carefully plan their approach to the far side blast doors. From above, the player has a clearer view of the patrolling Sentries on the mezzanine and upper decks.

If entered from below on **the main level**, the S.T.A.T. likewise appears in a relatively safer location to the side and provides the same analysis. From this standpoint, the player can access the lower deck or the dark passage on the main level beneath the upper deck.



[Combat Design Sketch – Tension Progression Curve]



[Combat Design Sketch – Layout Progression Mapping]

Either way, there is **a progression built into the combat design**, despite the relatively wide-open nature of this architecture. This is one large room, with multiple decks and lifts affording both player and robots the ability to jump down or ascend. The other main feature accessible to the player in all locations are large columns that afford good cover for stealth or combat.

The player will be able to **plan their approach to engage** the enemy; the route and tactics. The success of their approach will depend on combat skill, and their choice of route and order of robot engagement, so that the player them on one-by-one.

After beginning engagement with a number of the robot Sentries, **the player can begin to prepare** for the cluster of guarding Sentries near the exit. This cluster, mostly on the main floor, will be on alert and periodically look around. They will be more difficult to defeat all at once, or at close range.

This cluster near the exit will eventually play out as relatively **more intense open combat**. If the other nearby Sentries were already taken out, this will be easier. Patrols are configured to check in on this cluster periodically, which will cause this combat to ramp up before it dies down.

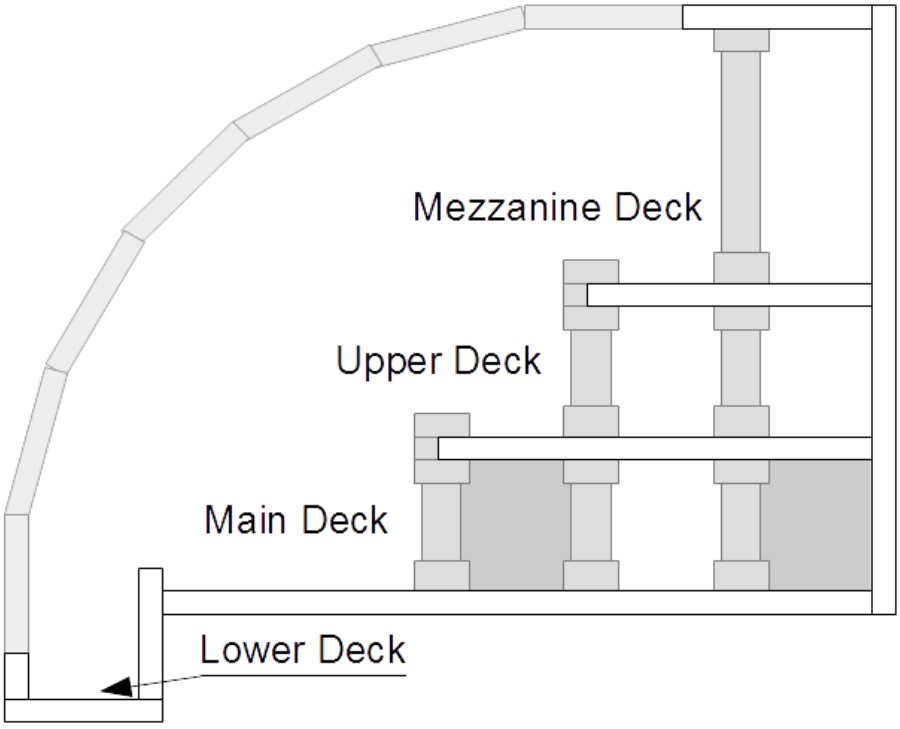
The player may elect to **finish the combat** and exit, or go back and to defeat all robots in this area. Either way, a hint routine will prompt the player to exit through the far side blast doors.

The blast door **exit will open to an ambush**, with multiple Sentries fortified behind cover blocks, and ready for the player. In addition, a Bomber robot, which the player has not yet encountered, is waiting just on the other side of the door, and will charge the player immediately. This area is small enough that there is no space for the player to maneuver, aside from retreating back to the main level, and behind the blast doorway.

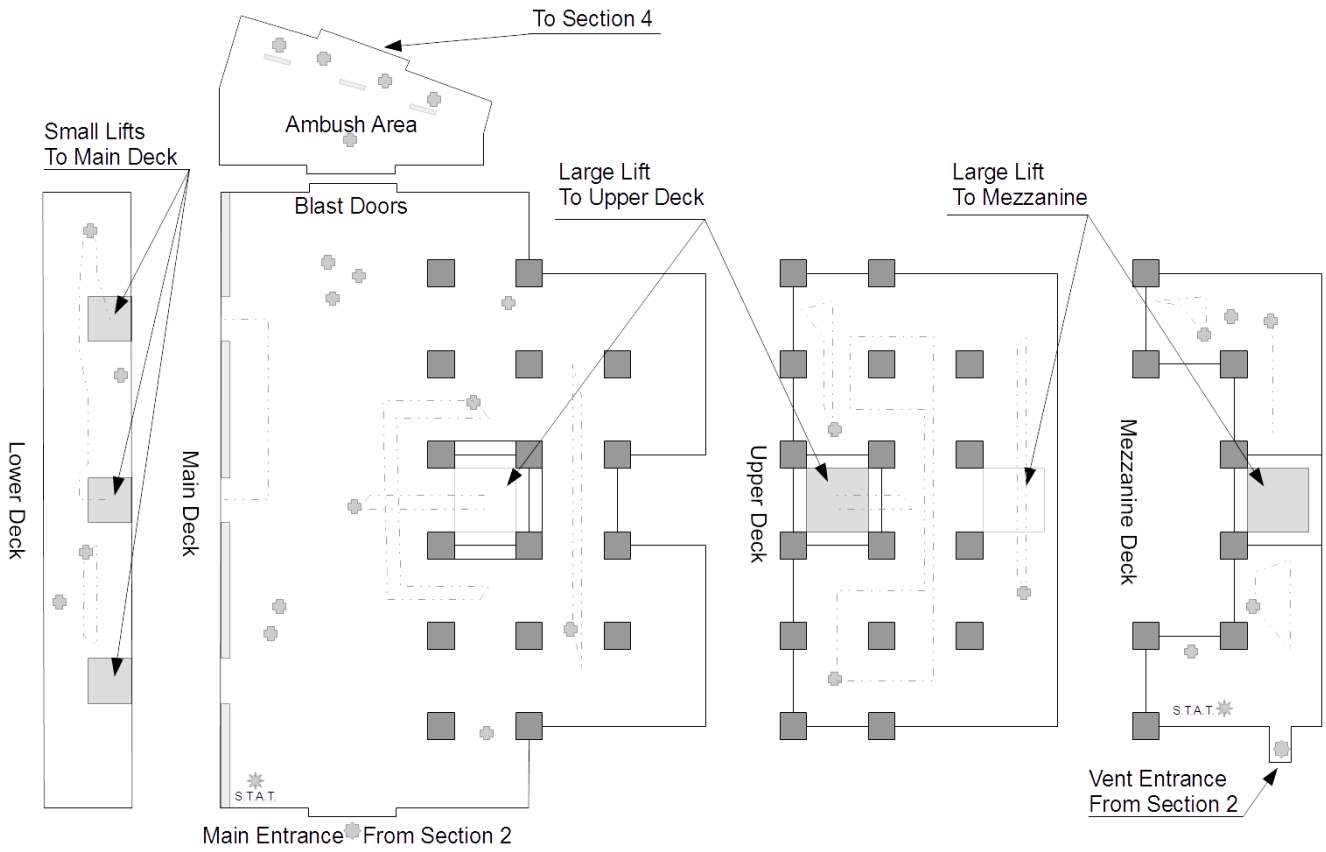
Once all robots in the ambush area are defeated, **the player is able to exit** to section 4.

Layout

The three main areas of section 3 include the opening areas, **the observation deck with multiple levels**, and the ending ambush area. The opening area may either be the very small vent up in the mezzanine, or the larger main blast doors angular space. The ending ambush area is a mirror version of that layout. The observation deck has a lower level, main level with covered dark passage, an upper level and the mezzanine level.



[Layout map – (composite, side view) Observation Deck levels, including curved window]



[Layout map – (composite, top view) lower level, main level (including ending ambush area), upper level, mezzanine level (including beginning vent)]

Features

The most prominent feature of section 3 is **the large curved window** that runs the length of the observation deck and reaches from the lower deck to the ceiling high above the mezzanine level.

The **lower deck is a narrow walkway** below the main level, with three small lifts for access to the main level. Combat along the lower deck is cramped with ample cover, but few options to dodge enemy fire.

The **main deck is a large floor** separated by a central large lift to the upper deck, where one side is open and well lit, and the other is covered by the upper deck. The covered area is dark and cramped with storage crates. The large lift is enclosed on three sides, which makes a narrow passage toward the far end of the observation deck. This feature, the crates and large columns that support the upper deck all provide a wide array of cover options. The open area has few cover options, but a lot of room to dodge and maneuver.

The upper deck has lift access to both the main deck and mezzanine above. There is always the option to jump down from one deck to another. There is less space on the floor of the upper deck, fewer crates and fewer columns for cover.

The mezzanine deck is a somewhat narrow walkway around the back wall of the observation deck, closer to the ceiling. There are fewer columns and crates for cover.

All decks have periodic **crouch cover** spaced at regular intervals, in addition to columns and crates.

Energy boxes are placed seemingly haphazardly around all decks and among various storage crates that are found throughout this section. This explosive hazard is an equal-opportunity combat danger, meaning the player and robots may have to evade ramping energy boxes that were damaged. The player may also understand this hazard as an element of the combat to take advantage of. In that way, the placement of the energy boxes is actually designed to provide both hazard and opportunity in combat to the player.

Player Action Result

This section presents the player with a significant **combat challenge, in both planning and execution**. The combat design is crafted to encourage early intentional play (planning ahead) and later improvisational play (chaotic combat and ambush). After defeated a larger number of enemies like this, the player will have accomplished a more sophisticated approach, and learned that there is utility in both careful planning and bold engagement.

This combat area serves as **practice for more advanced combat**, including engaging multiple enemies, using cover effectively and evading robot tactics like flanking.

The player will **learn about the energy box hazard**, and its nature as an energy storage unit from the S.T.A.T.

The player will be **introduced to the Bomber** robot class, and understand its purpose is to charge in melee combat to explode.

SECTION 4

With practice against significant challenge, **the player is ready for something new**. Section 4 is designed to provide a mix of enemies in a defensive posture against the player, ready for combat, within an environment that includes new features.

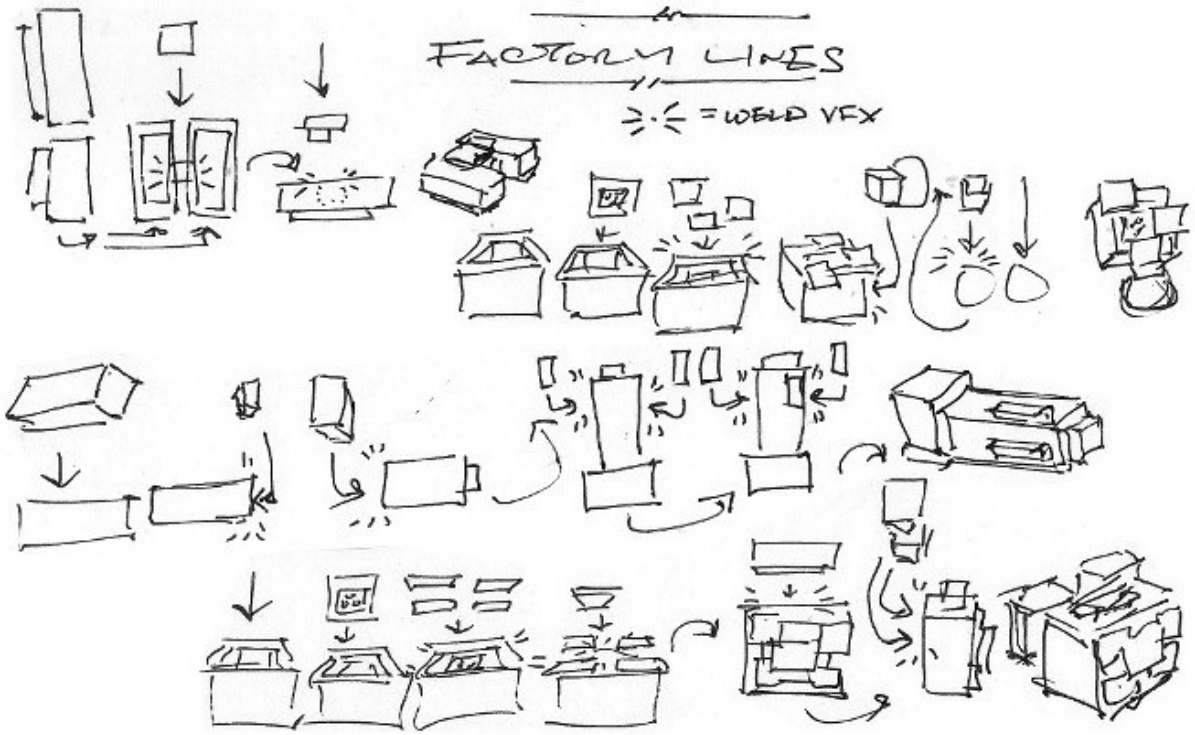
Progression

At one end of the factory, the player appears on a platform **overlooking the chaotic machinery** and sparks below. From this point, the S.T.A.T. appears to provide an analysis, including the tower bridge goal, the nature of this factory, that enemy fortifications appear ahead, and to be on the lookout for affordances in the factory to help the player.

Stepping down from the platform, the player may or may not notice a new level feature, **an energy recharger kiosk**. If the player does inspect and engage with the kiosk, they will see and hear an energy cube used to deliver energy to the gun they hold. They will encounter two more of these kiosks, another on the factory floor, and one at the invitation kill box room at the

end of this section.

The first area on the factory floor is dominated by two **factory lines** assembling heavy assault components. Each station along the factory lines includes machinery assembling and welding together individual pieces. This creates several large elements that serve as moving cover.



[Concept Sketch – Factory Line Assembly Progressions]

A number of **cover blocks fortify enemy defensive positions** around the factory lines. Multiple Sentry and Bomber robots are here and will engage with the player on site.

There is also a star case leading to **a long narrow walkway**, and a patrolling Sentry will also engage the player early while on the factory floor. Another Bomber robot and Sentry will move onto the walkway once the player has reached it. The narrow walkway serves as a very narrow location for combat, and an idea view of the tower and bridge outside.

The walkway is constructed to stretch over **a conveyor belt** that runs across the factory floor, dividing the near side and back side of the room, and carrying a steady supply of energy boxes.

The **far side of the walkway** also has a stair case leading to an area with cover block fortifications, including Sentries and Bomber robots that wait in ambush for the player. This small area is also enclosed with more factory lines.

The **factory lines** at this far end of the factory assembly more heavy assault components.

The far side of the factory floor includes additional **fortifications with cover blocks** for Sentries and Bombers. Medium and long range ambush attacks can begin as soon as the player disembarks from the long walkway. As before, the factory line palettes and components

act as substantial moving cover, obstructing long ranged combat.

There is a **two-story stair case with platforms** leading up the far side wall to the invitation kill box room above. Sentries are stationed around this area, and may engage the player from long range, and above at platforms either part way up or at the top.

The staircase leads up to a large room with multiple cover blocks and Sentries waiting to ambush the player from fortified positions. Once the player enters, the very large blast doors will close behind them, trapping them inside until a series of enemy waves are defeated. This room includes one energy recharger kiosk. This is **the invitation kill box**.

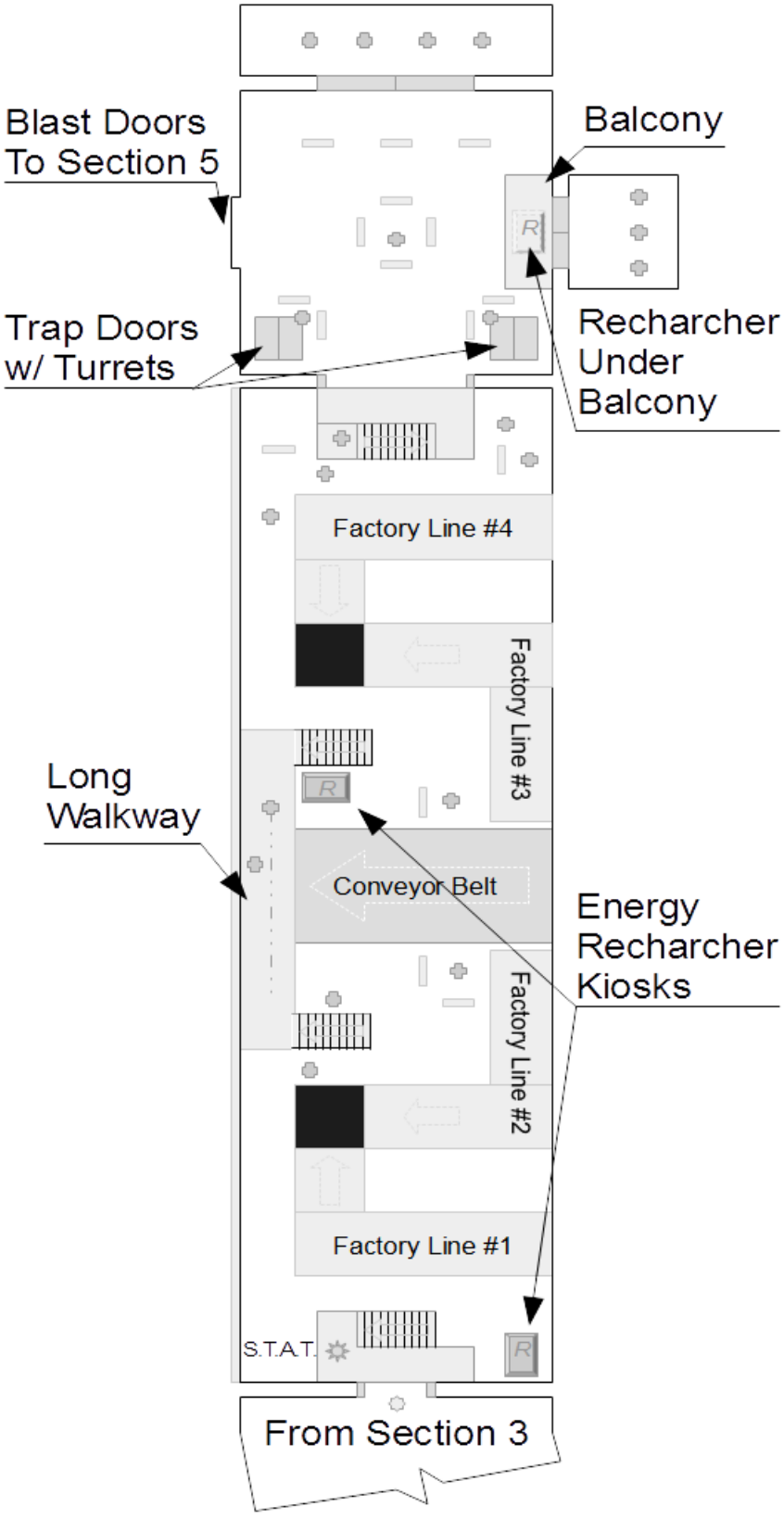
After those doors close, the blast doors to the tower bridge will display an array of red lights to indicate the doors are locked, and **multiple waves of enemies** will enter the room from all sides. The initial wave of enemies include four ground-level Sentries, and three Sentries appearing on a balcony above. When the ground-level Sentries are defeated, a new wave of three Bombers will appear at ground-level. When the balcony Sentries are defeated a separate wave will begin, with three more balcony Sentries, and two Turret robots, attached to rising platforms, that appear from trap doors in the floor, located at the corners of the room. These Turret robots will raise on these platforms above ground-level, providing a height advantage, and ability to reach across most of length of the room. The balcony Sentries will be able to cover half the room from above. The ground-level Sentries and Bombers will spread out around the room, taking cover and charging the player.

Once all the enemies have been defeated, the blast doors leading to the tower bridge are unlocked, as the **green lights above the blast doors** will show.

Layout

This long layout in section 4 includes the tall **factory floor and the invitation kill box** room ahead of the tower bridge in section 5.

[Layout Map – Factory Floor and Invitation Kill Box]



Features

The most prominent feature of the factory floor are **the factory lines**, including the large supply feed structures, the machinery of the factory lines, and the many moving parts and visual effects involved. The idea is to present a buzz of chaotic activity that appears fairly hazardous.

The **large windows** of the factory floor provide clear view of both the command tower and a bridge to the tower, several floors up from ground level.

The new level feature in section 4 is the **energy recharger kiosk** with a large energy-colored round pad to stand on, a storage of energy boxes above, and an energy delivery arm that protrudes in the direction of the player's held energy gun. These are effectively free energy recovery stations, recharging the energy gun ammunition to 100% capacity, which the player can see clearly using their HUD display of the energy gun. What is not explicitly described to the player is that this routine also

fully recharges the player's health. (this hidden story point is intentionally obscured)

A single large **conveyor belt** that runs across the factory floor. The conveyor has a steady supply of energy boxes that drop from a supply chute onto the moving belt and move slowly along. This belt has thick protective glass on either side, but is open above and close to the long walkway, which leaves the energy boxes open for potential damage, and the energy ramp-up routines that lead to explosions and chain reactions. A dramatic chain reaction is possible, but will eventually stop due to the timing of the energy boxes that drop from above.

A **long narrow walkway** stretches across the conveyor belt, and connects the near and far sides of the room. The most prominent view of the tower and bridge outside is from this walkway player goal.

Another energy recharger kiosk and **a stack of additional energy boxes** are placed at the far side of the walkway. This stack is both a hazard an opportunity for the player.

More factory lines on the far side assemble very large components, and the machinery is likewise large and unique in their mechanics and movements.

A large staircase with multiplier platforms lead up to the invitation kill box room.

The invitation kill box room includes **a balcony with blast doors** above the ground level.

There are **two floor trap doors** that will open to reveal rising platforms for the Turret robots during the kill box waves.

Player Action Result

By tackling the combined forces of Sentry and Bomber robots fortified along the factory floor, the player is gaining **experience in advanced combat tactics** against alerted enemies in tight quarters.

When the player gets used to the utility provided by **the energy recharger** kiosk, they gain a significant tactical advantage.

The player becomes familiar with the tactical advantage afforded when **multiple energy boxes** are close enough to set off a chain reaction against the enemy.

The player is introduced to a new robot class, **the Turret**, and gains knowledge of its toughness and rapid fire gun.

The multiple waves of enemies that encountered at the end solidifies the player's ability to **improvise in combat**.

SECTION 5

Progression

The player begins section 5 in a position to see down the center of the bridge to the tower.

The blast doors from section 4 open to a tall space with two-story staircases that lead up to a long walkway that stretches to the far end of the bridge. The ground floor is lower in the middle, with stairs leading down into what is effectively **a trench warfare setting**.

Not long after the doors open, the S.T.A.T. provides a typical signal to analyze the situation tactically. Unfortunately, this **analysis is incomplete** and offers only a warning to be on alert.

By this time, the large blast doors that let loose waves of robot enemies in section 4 open once again to release a new wave of six Bombers, that stream toward the doorway, to **attack the player from behind**. Only their own alert sound effects are offered to alert the player.

The player *may* realize the energy **recharger kiosk from section 4 is still available**.

The player *may* realize the blast doors have a control panel on the inside that can **close the blast doors** and keep the Bombers out, although that means the recharger is inaccessible.

In front of the player, **multiple robot Sentries are guarding** tactical positions, with cover blocks or the cover of staircase platforms. The beginning area has one on the ground level, one on a platform on flight up, and three more up on the top platform.

Engaging these first Sentries can be done with stealth, but the multiple angles the enemy has on this area means there will likely be **ranged fire from above** on the player.

On the lower level, one of two **Turrets set on raised platforms** is ready to offer cover fire against the player. If the player descends the stairs to the lower level, six Sentries are in position behind cover blocks, and four Bombers are also wandering closer to the far side. This area is designed to be most like trench warfare, causing the player to slowly make progress, while being alert for enemy flanking maneuvers.

In the far left corner of the lower level in the middle of the bridge, **an energy recharger** kiosk is in clear view.

In the far right cover of the lower level in the middle, there is a large **stack of energy boxes**.

Importantly, there is **no stair access to the far side** ground level from the middle.

On the **upper level platforms and walkway**, the player will encounter Sentries ready to defense the path to the tower. The walkway itself has two cover blocks set to provide effective cover for a Sentry patrolling the length of it.

Two Turret robots are high up, set on small platforms against the wall, on either side of the long walkway, and will engage with the player when they begin to walk along it. From this vantage point, they can even fire on the player down in the lower level trenches.

The long upper walkway also has **Sentries and Bomber robots in defensive positions** on the far side, behind cover blocks. There are also a number of energy boxes stacked behind them.

When the player is about one third of the way along the long upper walkway, the rest of the walkway will creak, shutter, bend and break, in **a dramatic crash to the lower level below**. It will actually smash onto one of the two raised platforms, destroying the Turret mounted there.

Although the walkway was the only structural access to the far side of the bridge, the **player**

is still able to jump from the remaining walkway structure to the broken long piece that is propped up by the raised platform below, and make it to the other side.

The broken walkway piece includes a cover block, and is set at an odd angle, making **the approach to the far side** ground level something like a low hill climb. At this angle, Sentry forces on the far side can fire on the player on this narrow walkway.

The two-story staircases on the far side, will still have Sentry and Bomber **forces that can fire or jump down** to charge the player.

Once all forces on the bridge are defeated, **the S.T.A.T. will appear** again, in front of a control panel at the blast door entrance to the main control tower. The analysis explains the control panel must be hacked to open the door and gain entrance to the tower.

After this panel is hacked, the doors will open to **a very large gallery**, lined with large columns like those seen in section 3, and blast doors on the far side of the gallery.

When the player enters the gallery, the doors behind them will close, red lights on the far side doors will open, to reveal the robot Boss. **The Boss will enter the room**, and those doors will close again until the Boss is defeated.

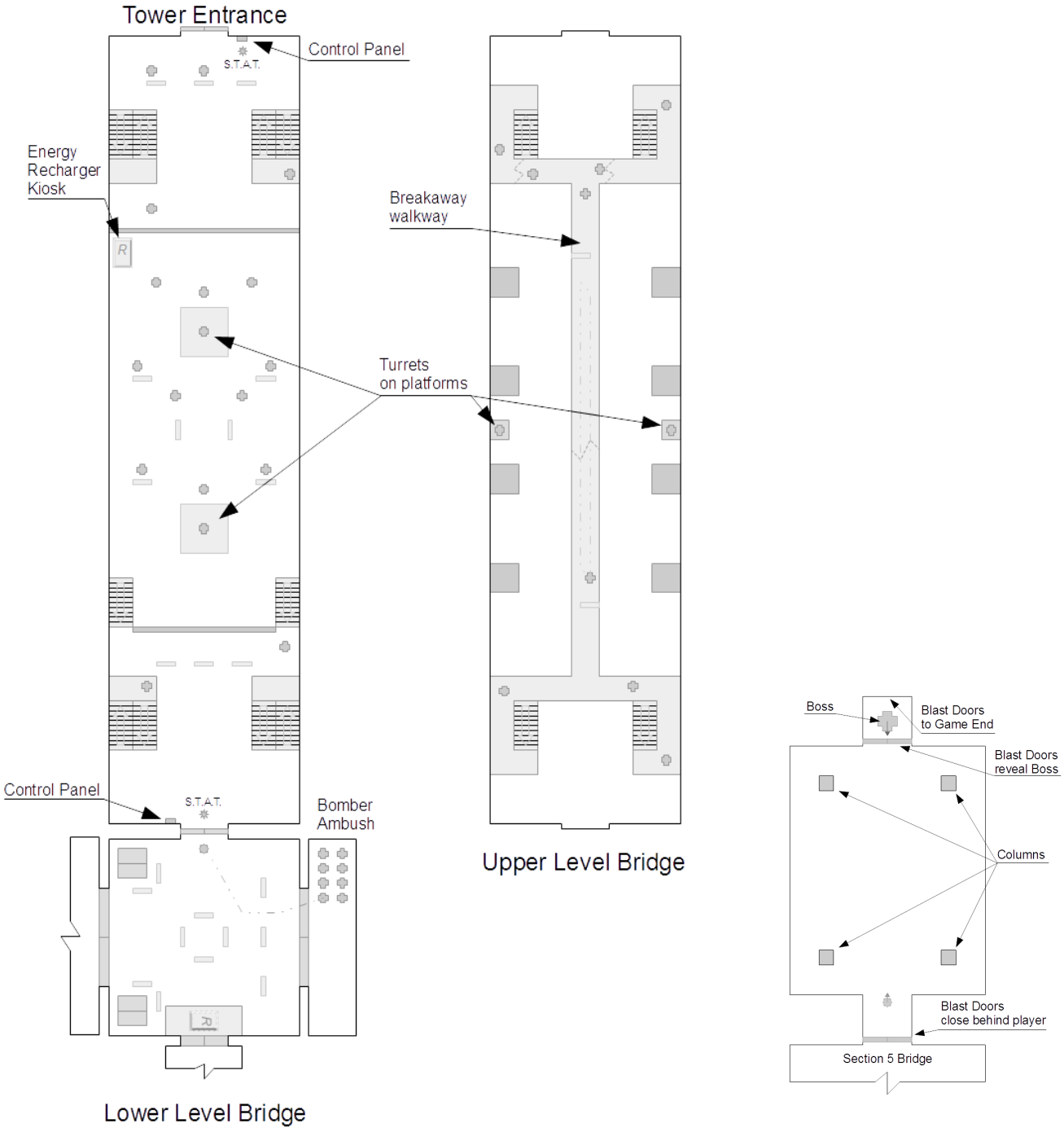
The Boss battle includes recognizing how this new robot class fights, and how it might be vulnerable. The player will see **metal plates pop off** the shoulders, and eventually expose an energy box that can destroy each arm. When no arms are left, the player will discover the Boss has a third attack from its chest, although its metal plates there are now vulnerable.

Once the last energy box in the Boss chest piece explodes, **the Boss is defeated**, and the final blast doors will open, giving the player access to the end of the game.

The end game sequence will play a very short sequence including game credits and a **“Mission Success”** banner, before returning to the main menu, with additional menu options unlocked.

Layout

The bridge to the main control tower at the center of the robot industrial complex is **a fortified defensive gauntlet**, protecting this entrance from forces even larger than the player represents as a lone infiltrator.



[Layout Map – (composite) Bridge Ground Floor, Bridge Walkway and Platforms]

[Layout Map – Tower Entrance and Boss Battle Gallery]

Features

An **additional ambush wave of Bombers** appear from behind the player in the section 4 kill box area. This area include the energy recharger kiosk that was there.

The beginning **blast doors can be closed** by activating the control panel on the inside.

Cover blocks in the beginning area offer fortified defense to the Sentry guarding there. The array of cover blocks on the lower level in the middle will form multiple layers of defense leading to the back of the lower level.

The **two raised pedestals** on the lower level are tall enough to give Turret robots high angle ranged combat advantage against the player, as well as provide full cover and flanking options to ground forces.

The **energy recharger kiosk** on the lower level is the only one on the bridge.

The **pile of energy boxes** on the lower level offer an opportunity to disrupt the fortified defenses of the robots, at some risk of making the situation more chaotic.

The **two-story staircases** on both sides of the bridge include platforms one flight up, which means there are more than a few opportunities for both player and robots to take advantage of angled ranged fire perspectives.

The **two Turret positions** set high on either wall of the long upper walkway create a dramatic defensive barrier, reminiscent to being pinned down by machine gun nests.

The long upper walkway down the center of the bridge is the main dynamic feature of the level, with **a dramatic collapse**, changing the structural navigation and breaking expectations of the player in the middle of heated combat. The final resting place of the broken walkway piece must form an odd stretch of tight combat for the player on approach to the far side.

The far side **blast doors must be hacked** to open. If the hack puzzle is engaged, this is the most complex puzzle offered in the game.

The large gallery used in the Boss battle has a high ceiling and columns that can be used as effective cover. It is otherwise a large open area.

The **final blast doors have red flashing lights** that announce the Boss entrance, and turn off when the Boss is defeated, before those doors open to the end space.

The **end sequence** is a simple short slide show that ends with the main menu, additional options unlocked.

Player Action Result

After handling the initial Bomber ambush, the player has **learned to react quickly** to the S.T.A.T. warning and the alert sound effects of the Bombers. These signals are cemented as important signals to heed.

The variety of options in the beginning, taking on the Bombers, using the recharger, closing the doors, using stealth or brute force combat, provides incentive for the player to **experiment**

with different tactics.

The multiple heights of the platforms, levels and pedestals will serve as practice for **three-dimensional navigation and combat**.

By engaging with three robots classes at once, in different positions and numbers, the player will necessarily **gain experience in a wide variety of combat situations**.

The player may recognize the utility of either the recharger or pile of energy boxes, and have further **experience using affordances to tactical advantage** in combat.

By experiencing the surprising and chaotic long upper walkway collapse, and then making their way to jump across and up to the far side, the player will be in the position of **overcoming the unexpected**.

When the blast door tower entrance is breached, the player will have **achieved the main mission** and story goal.

After the Boss is introduced and the player begins to figure out how this entirely new robot class can be defeated via exploding energy boxes in its construction, **the player will have earned the right to win the game**.

PROP DESIGN

Individual props the player interacts with serve to **extend the player's actionable reach** in the game world.

S.T.A.T.

The Surveillance and Tactical Analysis Tool (S.T.A.T.) is equipped by the player at game start. This tool appears as an in-world overlay, a ghostly **display of translucent icons** that flash to beckon the player. One icon is used to locate from afar, one to specify the standing location, and one to specify the viewing angle from that location. Together, these direct the player's attention to toward particular features of the level, present story points, and offer assistance in specific instructions and broader tactics.

The sequence of the S.T.A.T., after the player is in place and looking in the right direction, is to Left-Click to activate an analysis. The S.T.A.T. presents a brief, “Analyzing ...”, display to give the impression that the current situation is being processed for the best results. After a moment, the S.T.A.T. presents an analysis, a page or less of text with narrative and instructions. **The S.T.A.T. is, quite literally, a narrative device**.

ENERGY GUN

The energy gun that the player picks up from a defeated robot early on, is **the main offensive weapon** the player will use in the game. There are two fire modes available to the player, which toggle with Right-Click. The default mode is “Long Shot”, with a large projectile

shot that delivers a lot of blast radius damage on impact, at a significant energy ammo cost. The other mode is “Rapid Fire”, with much smaller shots, much less damage potential, but at a much lower energy ammo cost and at a much higher rate of fire. In addition, the energy gun recharges it's own ammunition over time, and depending on which fire mode is active, the HUD progress bar displaying the energy store will either show a larger increase at a slower rate, or a smaller increase at a higher rate.

ENERGY BOX

The player will be introduced to the energy box prop by the S.T.A.T., as a hazard to be avoided if it is damaged. What the player will learn over time is that this is **a dynamic prop with the potential to be both a hazard and a tactical opportunity**. If hit by an energy projectile, it will become damaged and the energy within will become unstable to the point of overload and explosion. Over the course of five seconds, the box will emit a loud ascending sound effect, while the box case pulses bright yellow in increasing frequency, and the suspended orbs of energy inside spin faster, and faster. If the box is damaged again during this energy ramp up, the process is accelerated twice as fast each time it is damaged.

At the end of this energy ramp-up, **the box will explode** and cause damage to the player, robots and other energy boxes within its blast radius, and damage them in the same way, with the potential then to cause a chain reaction. Energy box explosions also provide explosive force in physics to all dynamic physics-based objects in the game, within their blast radius, including player, robots, other energy boxes and arbitrary physics-based level elements, such as the broken walkway parts from section 4. The energy box is an integral part of the energy recharger kiosk level element, and of the robot Boss character.

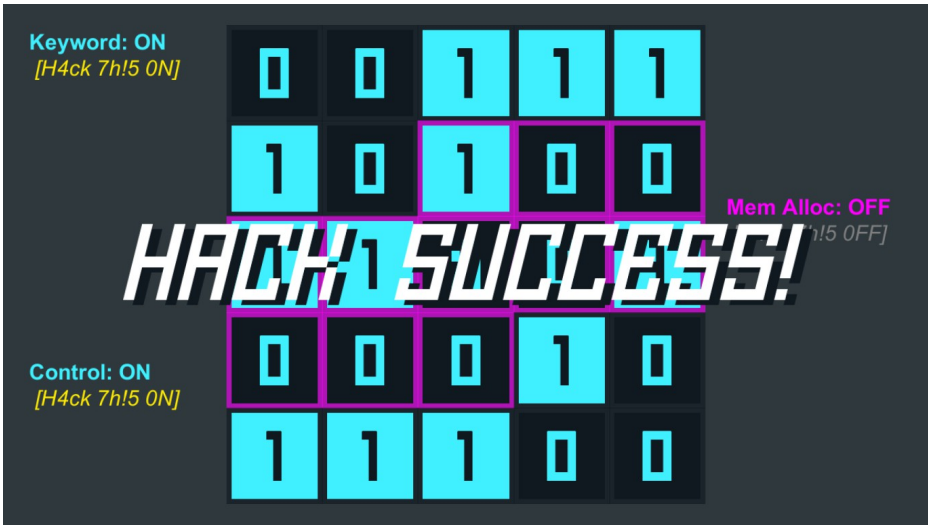
PUZZLE DESIGN

Points in the game story have the player face **the challenge to hack a control panel**.

By default, the hack **puzzle is disabled**. When disabled, hacking is simply performed by pressing the “E” key. The puzzle can be enabled individually, or toggled off again, in sections 1, 2 and 5, by typing “puzzle” before the hacking action is taken.

CONCEPT

To provide a unique challenge to the player, within **the theme of hacking** an unknown technology, the puzzle invites the player to manipulate a field of bits. Bits are binary stores of information that can either be 1 or 0, representing on or off. In this way, the player can be asked to “flip bits”, turn objects within a computer's memory on or off, and seemingly hack a system to override the security control room computer, halt an elevator or open a locked blast door to the main tower.



[Screen Image – Hacking puzzle]

As a side note, the inspiration for this kind of bit manipulation came from the knowledge of bitwise operations in C++ programming, and **the puzzle-like exercise of political gerrymandering**. The act of collecting bits of one kind into one area, and moving other bits into another area, to change the overall outcome, is the heart of the puzzle mechanic the player will be introduced to early, and challenged with by the end.

PLAYER ACTION

The player is presented with **a grid of 1s and 0s, and an array of buttons in-between them, that can switch pairs of bits**. The button action the player engages in trades the position of two bits, and can freely toggle them. The instructions for the game will introduce this as “bit flipping”, and the player is asked to flip bits so that 1s can be collected, and 0s can be collected, into areas of the grid outlined and named as a sort of computer memory object.

Next to the name of the bit group, the activation state of that object is labels as “ON” or “OFF”. **If there are more 1s in the group, it is “ON”, if there are more 0s in the group, it is “OFF”.** There are directions indicating to the player what objects need to change to perform the hack and solve the puzzle. The directions appear as “leet speak”, such as “H4Ck 7h!5 On”. If the object is in the correct state, no directions appear next to the object name.

Once all the objects displayed are set to the target on or off state, the hack is complete, and the game presents **a puzzle win banner** to the player, “Hack Success!”.

PROCEDURAL GENERATION

To maximize value in replay situations, the puzzle is designed to be generated procedurally, with a definite solution, a beginning state that is not already solved, and a level of difficulty matching the difficultly dictated by the story. **It is different every time**.

PROGRAMMING

APPROACH

A methodical approach, **valuing the attention spent on early testing and maintaining consistency**, will ensure efficient development of code and the integration of systems.

As such, an emphasis on architectural **organization and code standards** lay a framework for overall development for the consistency tenant.

The status quo of testing relies on standing up a playable build from prototype tools as soon as possible, and then maintaining play-ability throughout development with the mantra, **“Always playable”**.

ORGANIZATION

A high-level organization provides **a division of code labor** that covers all cases.

Prototype Tests

Tests that require code live in its own category, as the final implementation may be divided among the established architecture categories. This **allows rapid prototyping** without needing to adhere to the consistency standards, as the final implementation does.

Data

Data objects store **unique compound organized data**, and potentially initial values.

System

System objects manipulate data objects, and hold no data themselves, **serving global methods to tool components**.

Tools

Game object components meant to be instanced and act as individual agents in game scenes, using direct references to other game objects, leveraging both global methods and data structures provided by the other categories of code.

LARGE ASSETS, LIKE LOADING ART AND AUDIO, AND BROAD USE OF CONSISTENT METHODS, LIKE PLAYING AUDIO, MAKE USE OF DATA AND SYSTEM CODE. THIS VERSION **ONLY USES TOOLS** AS A FINAL CATEGORY.

STANDARDS

Code and development standards alleviate cognitive load and **promote reliability through consistency**.

Separation

Discrete data, systems and tools narrow the scope of issues, and promote robust unit testing. Integration of smaller divisions of code can be made with less complexity, as a minor volume cost. An ideal to strive for includes **atomic code with modular capability** for integration.

Communication

The most basic form of modular coding can include turning other tools in a scene on or off, as an entity component architecture promotes this simple level of communication. For more complex, or wide-ranging systems, discrete managers can access global methods and reference arrays of tools. Establishing an “upstream” source for signal communication flow is critical to the design of sub-systems, as the maintenance of **one-way communication, wherever possible, is highly valued**.

Protection

Final implementation requires protection for all but those methods and properties that must be accessible. Migration of prototype code includes **a protection pass**, along with division and general cleanup, to ensure errant behavior is minimized.

Comments

Minimal concise comments are used to note particular tactics, and disambiguate objects. The exception is **a consistent header with author and one-line class description** for each file. Prototype code migration includes cleanup of development note comments. Public methods should include summary comments with parameter definitions, for tooltips, where method and parameter names are insufficient.

Naming

Typical naming conventions for objects will be used with names that are **concise, descriptive and consistent**, including camel-case for dynamic variables, all caps for constants, Booleans describe an affirmative condition, etc. In addition, variable names will largely describe the data as a noun, method names will largely describe the behavior as a verb. These names should result in code lines that are as close to human-readable as possible.

Readability

Consistent formatting is key, including new lines, indentation and spacing. Organization of declaration groups will be adhered to, within both variables and methods, such that a new line separates public, private and constant variables, standard methods are at the top (in typical order of execution), and custom methods follow (in typical order of execution).

PIPELINE

The workflow pipeline is to be researched, tested and **established prior to development**. Revisions to the pipeline will be considered only as a last resort, and only after careful review of the issues raised.

ASSET SOURCES

Careful consideration must be taken for any royalty, legal or conflict of interest issues prior to committing to use of outsourced asset. Credits must be noted in full for all outsources that require it by license. Asset license agreements by contract must be completed before assets can be integrated.

NO OUTSIDE ASSET SOURCES ARE USED.

ART DEVELOPMENT

2-D assets will **conform to standards** of color, font, resolution and size. 3-D assets will maintain relative polygon count for the art style and optimization. Visual effects will maintain minimal particle count, image size and shader pass for optimization. The standard TrueType font file format will be used. The standard PNG image file format will be used.

3-D assets will be modeled, UV mapped, normal mapped, rigged and animated in a separate application (Maya), however each stage must be tested through to the engine (Unity) for quality assurance and technical confirmation. Additionally, **early tests will be used as stand-in implementation** and early integration. The standard FBX file format will be used.

NO MAYA 3-D ASSETS ARE DEVELOPED. ALL 3-D ASSETS CREATED FROM **PRIMITIVES IN UNITY**.

AUDIO DEVELOPMENT

Audio clips will be **processed consistently**. Source audio will be free of distortion or background noise. Audio clips will be trimmed of silence, mixed to a mono track, normalized and set to a optimized rate for minimal size; between 11k and 16k. (Music may be a higher rate) Audio clips meant to loop will be free of audible pops or changes in quality or tone. The standard WAV audio file format will be used.

NO MUSIC IS USED.

CODE DEVELOPMENT

Prototype tests will be conducted separate from the project, using only the necessary assets to test and complete to feature success. (a.k.a. **Rapid prototying**) Code integration to the project will include cleanup, a protection pass, division of labor, and a pass to modularize and generalize methods and tools as much as possible. Finally, comments, including method summaries and tooltips, will document the code for future reference and use.

LEVEL DESIGN

Prior to building levels, playgrounds for player action and enemy behavior, including combat testing, should yield **a set of actionable measures** for general scale, navigation, sight lines, combat options, timing and pacing, etc.

Beginning with player education needs, story beats, a combat design sequence, a logical architectural construct, or some combination of all these, **a paper prototype sketch layout** should provide both top-down and perspective illustration of the player experience.

White box level layout can be build from this layout map, to determine validity of design concerns via in-game play and player perspectives. **Navigate-able space is the primary concern** at this stage, with visible space being secondary. The player's movement through the space provides a relative dimension of time, and so the qualities of pace, rhythm, etc. can also be evaluated for quality in relation to the source of needs that propelled the paper prototype.

The gray box stage includes level dynamics, and minor lighting design to convey the interaction between shape, material, light and shadow. The level dynamics will include all level characters, movers, events, visual effects, cinematics, props and physics-based elements. This also includes **a full combat design pass** to determine success in challenge, tactical options, progression, surprise, and pace.

An orange box stage seeks to use the previous level progress as **a reliable platform to tune** and revise critical gameplay features, including player actions, combat design, A.I. Behavior, visual effects, lighting, materials, animation, sound effects and music. The goal is to reach a deliverable state.

The final stage would be reserved for **detail polish and fine tuning**, with only a modest consideration for any change or additions to level elements or configurations.

WITH SOME EXCEPTION, THIS PROJECT IS LIMITED TO DEVELOPING TO THE **WHITE BOX STAGE FOR LEVEL LAYOUT AND GRAY BOX STAGE FOR COMBAT DESIGN.**

GAME BUILDS

Unity game builds will be performed to the **WebGL / HTML5 platform**, to be released and distributed via web page location. The web page will be customized for theme, and additional material links, such as gamplay videos and a walkthrough document. The limitations to the Unity WebGL loading routine and progress bar will be made known to users upon reaching the web page.

For gameplay video recording, **a separate Windows standalone build** will be used to ensure a high quality video capture. Measures will be taken to ensure the viewed gameplay quality results match the WebGL version.

SERVER MANAGEMENT

To maintain faith in the “Always Playable” mantra, builds will be **tested first offline, then online in a separate temporary folder** on the website server, accessible only for development. Once testing via browser confirms utility and quality, the temporary folder will be switched with the live folder, exposing the updated version for world wide access while maintaining a consistent link from arbitrary web locations. The previous version will be kept, for purposes of reverting, until the next update is tested offline and uploaded in a separate temporary folder, as before.

TESTING

Testing early and often, both to new changes of specific features and in the overall player experience, will provide some measure of clarity for aspects of engineered development.

TEST PLAN

A plan to test, **from the smallest case out to the broadest**, should avoid having to revisit previous development.

Unit

A unit test should start with confirmation of the **most detailed** choices, the individual methods, and the atomic objects as being successful in meeting the expected results.

Integration

Integration tests include **two or more units working collaboratively**, up to and including whole sub-systems. Consistent communication flow between units, validation of input, error handling and consistent manipulation of data are keys to successful results.

Usability

Usability tests center on the conduit between the system output and the system input: the human user that completes the play loop. Human subjects determine the feedback results for usability tests. As such, a premium is placed on any opportunity to place a human in this play loop and collect feedback data. Due to the play loop conduit property of the user, **the most valuable feedback data is both gameplay view and face view of the player simultaneously**. The next best is live observation of player, then recorded notes from player. The least valuable feedback data is that which is corrupted by leading questions, hints or help, or otherwise advanced knowledge of the gameplay. This data should be discarded, or taken with very little regard for reliability. No matter the quality of the feedback data, careful evaluation must be performed post-collection, to ensure a lack of bias and best chance to understand the root causes of the literal data.

Stress

Stress tests are performed to ensure the overall system can **recover from situations that were not designed**. A creative process begins to devise tests that stress the game system in ways that were unforeseen. Then, those conditions are forced to determine how the system will perform, and how it might detect and recover from the imbalance, while still within the intended design.

ISSUE TRACKING

Feature issues that are found will be recorded, tracked and **addressed in order of feature priority**.

Bug Reports

Bug reports will include the developer who found the issues (for regression testing), the issue title (including the related feature(s)), the issue description and **steps to reproduce the issue**. Notes and relative priority have the option to be included on bug reports.

Feature Extensions

Any features that call for additional **extension will also be tracked alongside bugs**, as a means to collect potential plans for development effort in a single prioritized list. Feature extensions will include the feature(s) involved, an extension description and reference to any external design materials to define the extension. Notes and relative priority have the option to be includes on feature extensions.

PRODUCTION

METHODOLOGY

Development of this project will be conducted in a Lean manner, specifically using an Agile methodology. This primary aim is to reduce and **eliminate any waste of time, attention or effort**. Further, development practices are continually updated in response to results attained, along with the revisions to scope, priorities, challenges and resources.

APPROACH

Initial efforts include identifying all features the game calls for, including the detailed understanding if the feature's success, and then prioritizing these features based on how important it is to the player experience overall. Likewise, any challenges to reaching those feature goals should be identified and prioritized by risk. Finally, all resources available to assist in reaching those **feature goals are identified and prioritized** by utility.

Together, these assessments become **the goals, risks and utilities that frame the development process**. Together, these qualities of the development guide decisions with regard to taking future risk and engaging feature extensions.

SCOPE

The full list of game features only describes the scope of work. **The project scope includes the goals, the task complexity, and risks to reaching those goals**. Overcoming those risks and challenges will have to be factored into the road ahead.

RESOURCES

The resources that can be leveraged to achieve the feature goals include **manpower, available skills and techniques, and of course, time**.

THIS PROJECT IS A **SOLO EFFORT** (MANPOWER = ONE), AND ROUGHLY SIXTEEN WEEKS WERE ALLOTTED FOR DEVELOPMENT.

VALUES

In the same way theme directs arbitrary decisions related to art, audio and design, production **values help to make decisions** that impact the ability for the development progress.

EXPERIENCE PRIORITIES

The experience priorities **closely align with design priorities** for player experience.

1. Action gameplay
2. Polished combat
3. Narrative quality
4. Aesthetic quality

DEVELOPMENT PRIORITIES

Development priorities reflect the balance between features goals and risks and speak to **the response quality the game system has to the player**.

1. Player action control
2. Enemy A.I. combat behavior
3. Level design
4. Combat design

SUCCESS CRITERIA

Feature goal success criteria is a critical definition needed for completing the picture of the project scope. There is an emphasis in getting the fundamental minimum requirements for success developed first. Minimum success criteria is **guided by the experience priorities, and design priorities**. Where features are also aligned with development priorities, there is a need to drive the success criteria further. This success criteria become targets, to be communicated clearly, early and often, and inspire individual contributors to create to that measure.

DEVELOPMENT PROGRESSION

Phases of development are implemented as a Lean means to **make deliberate progress in a reliable way**. Each phase achieves goals that set up the next phase for success.

CONCEPT

The goal of the concept phase is to arrive at **a full game concept with features detailed**. Finding a comprehensive, concise and clear theme is a primary challenge at this phase.

PROTOTYPE

The goal of the prototype phase is to **answer the questions raised about how to build** the most challenging features, through research and rapid prototype testing. Devising tests that yield the most informative data results is a primary challenge at this phase.

ALPHA

The goal of the alpha phase is to **build every feature in some form**, and implement them in a cohesive fully-playable build. Feature integration is a primary challenge at this phase.

BETA

The goal of the beta phase is to **revise every feature toward completion**, focused on the highest priority features and those furthest from success criteria. Bug fixing is a primary challenge at this phase.

FINAL

The goal of the final phase is to **polish every feature to completion**, focused on the highest priority features and those furthest from success criteria. Creatively finding opportunities for feature extension that is both efficient and graceful is a primary challenge at this phase.

PLAYTESTING

Playtesting is a critical task to perform for all development personnel, however it is important to note that **playtesting is not playing**. It is testing for resulting data that can inform design and development.

TEST CRITERIA

Playtests must begin with test criteria, even if the criteria is simply for general player gameplay feel; something development personnel should engage in regularly. Simply noting the scope and focus of the test ahead of time may be all that is needed to have the feedback in mind when it presents itself.

FEEDBACK SOURCES

Playtest results can take the form of hard data, such as gameplay metrics recorded for comparative analysis, or qualitative data, such as the self-reported “thinking out loud” typically asked of playtesters in general gameplay feel testing. **Ensure the ability to record the**

feedback data.

IMPLEMENTATION STRATEGY

As much as possible, playtesting should **allow the normal play and use of the system** to occur during the test, with as little interruption or distraction as possible. If coupled with the tactic to collect the most valuable playtest data, there emerges a preferred playtest configuration for the best qualitative data.

The idea setup is to record the gameplay view and the player's face at the same time, as in picture-in-picture. **A zoom recording of a playtester while they play** is a simple solution that reaches this high standard.

APPENDICES

APPENDIX A – GDD VERSION HISTORY

1. v.001.9.30.21 [gs]
   Initial structure, format and style
2. v.002.9.30.21 [gs]
   Initial sections: General, Art, Audio, Design, Programming, Production, Appendices
3. v.003.9.30.21 [gs]
   Draft General section
4. v.004.10.1.21 [gs]
   Draft Art section, minor cleanup
5. v.005.10.2.21 [gs]
   Draft Art section
6. v.006.10.2.21 [gs]
   Draft Audio section, minor cleanup
7. v.007.10.3.21 [gs]
   White Box added to General section, disambiguation format exploration, notes revision
8. v.008.10.3.21 [gs]
   Secrets appendix added, Draft Design section
9. v.009.10.4.21 [gs]
   Draft Design section
10. v.010.10.5.21 [gs]
    Heading format refactor, Draft Design section
11. v.011.10.6.21 [gs]
    Draft Design section, image element placeholders, minor cleanup
12. v.012.10.7.21 [gs]
    Draft Design section
13. v.013.10.9.21 [gs]
    Draft Programming section

14. v.014.10.9.21 [gs]
    Draft Production section
15. v.015.10.10.21 [gs]
    Image and chart element inserts, minor revision
16. v.016.10.11.21 [gs]
    Image and chart element inserts, trivia added to game secrets appendix
17. v.017.10.13.21 [gs]
    Layout element inserts
18. v.018.10.14.21 [gs]
    Layout element inserts, image revision
19. v.019.10.15.21 [gs]
    Layout element inserts, layout sketch inserts, concept element inserts, image revision
20. v.020.10.16.21 [gs]
    Layout sketch inserts
21. v.021.10.17.21 [gs]
    Combat sketch inserts, layout sketch inserts, minor revision
22. v.022.10.19.21 [gs]
    Layout element inserts
23. v.023.10.20.21 [gs]
    Factory line sketch inserts, revisions
24. v.024.10.26.21 [gs]
    Layout element inserts
25. v.025.10.28.21 [gs]
    Layout element inserts, revisions
26. v.026.10.29.21 [gs]
    Layout element inserts
27. v.027.10.30.21 [gs]
    Layout element revisions

APPENDIX B – GAME SECRETS

There are aspects to the gameplay that should not be revealed to a commercial player, but **should be known by game developer players** who would like to evaluate the level design, combat design and creative problem-solving demonstrated.

Cheats are freely displayed for the player upon start and respawn. Secrets are only revealed from the main menu once the boss battle has been won, and the game has been completed. Revealing these secrets after a full play through provides reasons to replay the game.

CHEATS

- Typing “skip” will teleport the player to the next section, except from within section 5.
- Typing “puzzle” will enable or disable the hack puzzle mini-game in sections 1, 2 and 5.

SECRETS

- Typing “finish” at the main menu unlocks all main menu options.
- Typing “boss” in section 5 will teleport the player to the boss battle.
- With the energy gun, right-click will toggle between two gun modes: “Long Shot” and “Rapid Fire”
- The hack puzzles in sections 1, 2 and 5 are procedurally generated, and will have different solutions every time.
- The energy recharger kiosk station fully restores both the energy gun ammo and player health.
- If you die, or are severely injured, in sections 1, 2 or 3, enemy forces are reduced on respawn or next section.

TRIVIA

- The energy gun “taken” from the Sentry in section 1 also appears among the scattered robot parts after the initial stealth kill.
- The blue lights blink pattern in the security control room main console never repeats.
- The factory floor in section 4 creates the full set of heavy assault robot components. The factory lines can make the parts for one Boss robot class every 16 seconds.

APPENDIX C – TBD