

Missile Command Design Document

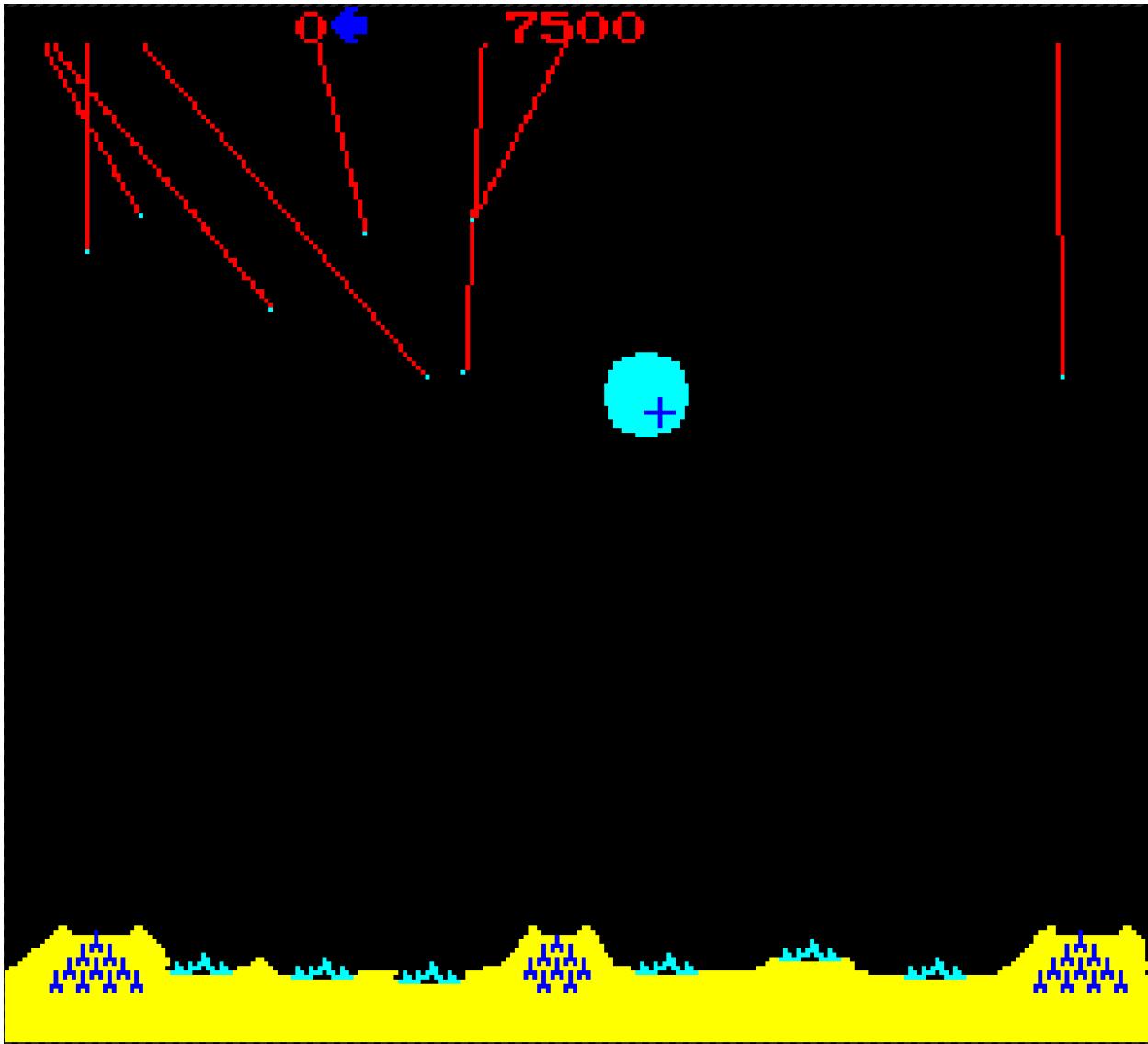


Image taken from a screenshot of gameplay from : <http://my.ign.com/atari/missile-command>

I. Overview:

This document will deal with the arcade version of Missile Command. This can be played at <http://my.ign.com/atari/missile-command>. Note that our version will be identical to the version found in the link with one exception. The version found here automatically launches a missile from whichever silo is closest to the mouse cursor. In

order to stay true to the spirit of the original 1980 arcade version, we will use three different keys to manually launch a missile from each silo respectively.

Missile Command is a 2D shooter arcade game that tasks the player with protecting six cities from waves of incoming ballistic missiles. In order to protect the cities, the player must detonate the incoming missiles before they reach the ground by launching his or her own missiles from one of three weapon silos located on the ground. Each weapon silo has a limited amount of ammo and can be destroyed completely by incoming missiles.

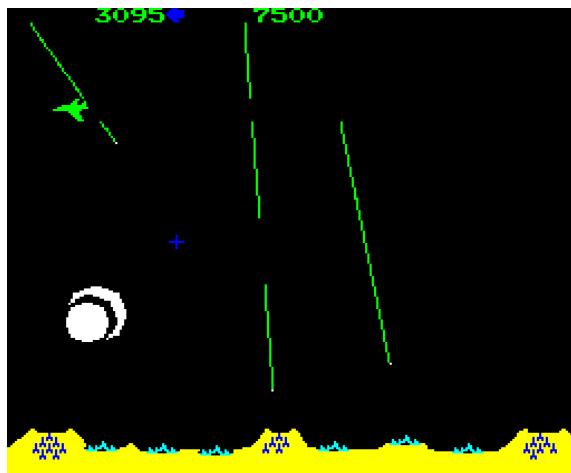
The game's visual style makes it look like a simplistic (almost cartoony) strategy simulation. Loud explosions and bright colorful flashes indicate missile detonations, providing a wealth of visual and auditory feedback to the player.

II. Game Elements:

1. CITY: A **city** is one of the six bases located on the ground that the player must defend. A city is 14 pixels wide and five pixels tall. If a city is hit by an incoming missile, the city is destroyed. A blast virtually identical to those associated with allied missile blasts occurs at the location of the city when it is destroyed. A city can be gained back every 10,000 points that the player scores. However, for the sake of time, we have decided not to include this feature. Once all six cities have been destroyed, the game is over.

2. ENEMY MISSILE: An **enemy missile** is a projectile that starts from the top of the screen and moves downward at a constant speed to destroy either a city or a missile silo by reaching it. An enemy missile is a single flashing pixel but has a red trail of pixels behind it showing where it has been. Missiles spawn at random points and times at

the top of the screen and each randomly target one of a handful of possible target destinations (i.e. cities and missile silos). Missiles typically travel in waves of 5 to 8 every few seconds. A level ends when all enemy missiles for that level have either been destroyed or have reached their targets. In the early levels, enemy missiles only target and destroy cities. In later levels, enemy missiles can also impact and destroy missile silos. As the levels progress, there is an increasing number of enemy missiles, which travel at increasing speed. Initially, the missiles only travel about 27 pixels per second. Additionally, at later levels, there are missiles that will split into multiple new missiles if not destroyed quickly enough. The missile may split into two, three, or four missiles (the number seems random). At least one of the new missiles will remain on the path that the original missile was on, with the others taking new paths.



An incoming wave of enemy missiles. Some have already been destroyed. There is also the blast of an exploding allied missile.

There are also “smart” bombs that move toward a city or silo and avoid your allied missiles. The only way to destroy these is to use the central silo, since it launches missiles that travel faster than the other silos. These missiles are much harder for the smart

bomb to avoid. Both the smart bombs and the faster launching speed of the central silo were eventually cut from our build.

3. MISSILE SILO: A **missile silo** is one of three bunkers on the ground that can launch allied missiles to destroy incoming enemy missiles. The three silos are located at ground level at the left, center, and right parts of the screen respectively. Each missile silo contains 10 allied missiles that can be fired independently from one another. The number of missiles a silo contains is depicted by the number of physical missile objects that are located directly underneath it (depicted below). Once a missile silo reaches only three missiles remaining, the word low will also appear in large blue text directly underneath that silo. If a missile silo is hit by an enemy missile, it is destroyed immediately, regardless of how many missiles it had remaining in it. A blast virtually identical to the blast associated with allied missile detonations occurs at the missile silo's location. The player can no longer fire from this missile silo. All missiles depicted in the silo are removed.



An image of a missile silo with 5 remaining missiles indicated by the missile objects located inside of it.

4. CROSSHAIR: The **crosshair** follows the mouse cursor and indicates where an allied missile will detonate. The crosshair is 7 pixels wide and 7 pixels tall.

5. ALLIED MISSILE: An **allied missile** is launched from one of the three missile silos to destroy incoming enemy missiles. Allied missile are depicted as a single solid white pixel with a blue trail behind them showing where they have been. Allied missiles also

travel at a constant speed when launched, but they are much faster than enemy missiles. The missiles launched from the left and right missile silos travel at about 240 pixels per second. The center missile silo launches missiles that travel at twice that speed. For our build, however, all three silos launch missiles at approximately 240 pixels per second.

Allied missiles automatically detonate once they reach the location that the crosshair was in when the allied missile was fired. After a short delay the detonation creates a visible circular blast. This blast expands for 2 seconds and then shrinks over to course of 1 second until it is gone. The radius of the blast at maximum size is approximately equal to the width of a city. If an enemy missile enters this blast radius, it is destroyed as well. Due to the delay in the explosion as well as the missile travel time, it is important to lead enemy missiles by a small amount to ensure that they do not exit the blast radius before the detonation occurs. If a player runs out of allied missiles, they will lose control over the remainder of the level.

6. AIRPLANE/UFO:An **airplane** or **U.F.O.** is an object that moves horizontally across the screen at a fixed altitude in the sky. They do not always move with the same speed or at the same altitude (it depends on the level). In the first few levels, they travel fairly slowly, staying on the screen for several seconds. They can be destroyed with an allied missile for bonus points. Initially, planes and U.F.O.'s do not fire at the player, but in later levels, they will launch enemy missiles as they move across the screen. Both airplanes and U.F.O.'s did not make it into our final build.

Scoring: Players do not “beat” the game. Instead, they compete to get the high score. Players gain 25 points for each enemy missile destroyed. Players gain 100 points for each airplane or

U.F.O. destroyed. Both of these update the score in real time. At the end of the level, players receive bonus points for how many missiles they have remaining out of thirty and how many cities they still have out of six. Players gain 5 points for each missile not used that level and 100 points for each surviving city.

Scoring Table:

Object	Description	Point Adjustment	When
Enemy Missile	Destroyed enemy missiles	+ 25 each	Immediately
Airplane/U.F.O.	Destroyed enemy airplanes or U.F.O's	+100 each	Immediately
Allied Missiles Remaining	Unused allied missiles at the end of the level	+5 each	End of Level
Cities Remaining	Cities not destroyed by the end of the level	+100 each	End of Level

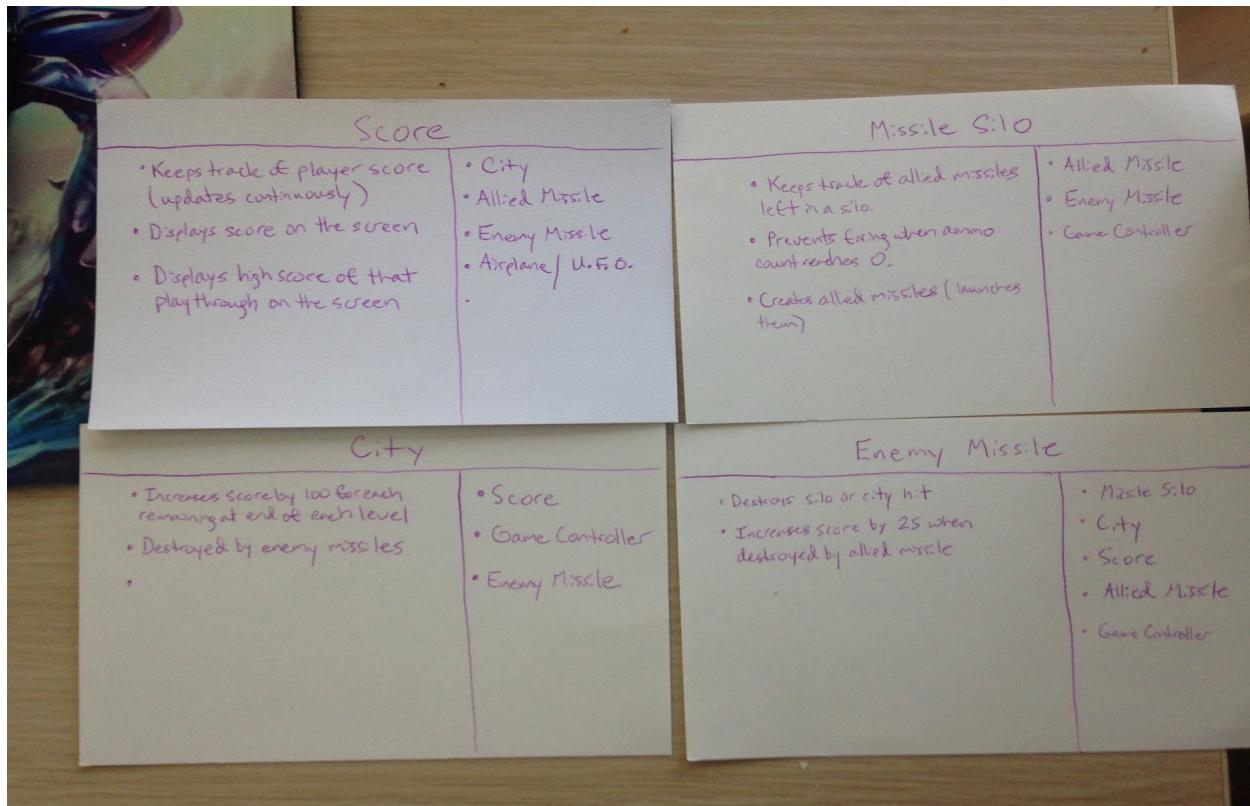
Controls:

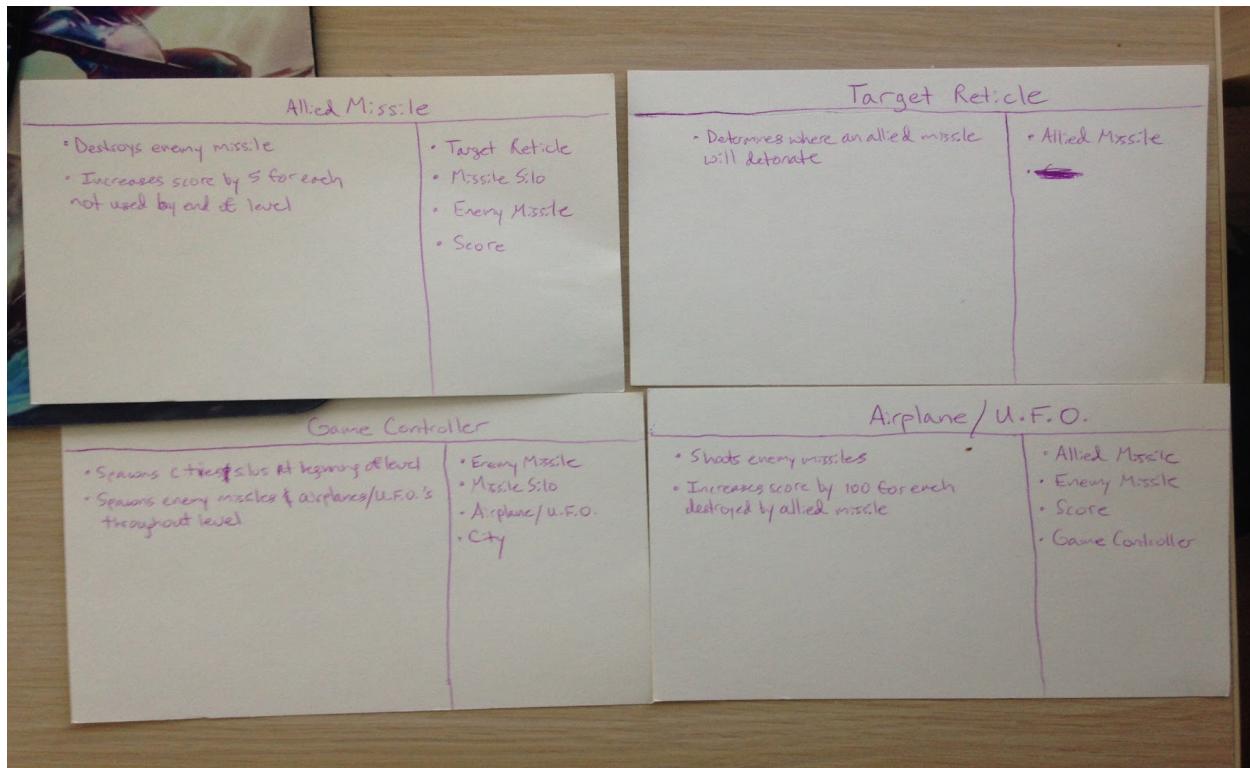
- 3 separate keys to launch from the 3 missile silos (A launches missiles from left silo, S launches missiles from center silo, D launches missiles from right silo). Double tap a key to launch a missile from that silo.
- Mouse used to move the targeting crosshair to aim where the missiles will detonate. Missiles will detonate wherever the targeting crosshair was when one of the three launch keys was pressed.

III. Technical Planning:

Camera/Screen Size: As measured off of a screenshot exported into Photoshop: the game area is 512p x 462p. It does not matter how large we end up making the screen as long as the pixels remain the same.

CRC Cards:





IV. Assets:

Sprites: Sprites could not be found online. They have been recreated in detail on makepixelart.com. Link to the sprite sheet:

<http://makepixelart.com/artists/anonymous/missilecommandsspritesheet>

<http://makepixelart.com/artists/anonymous/missilecommandspritesheet2>

<http://makepixelart.com/artists/anonymous/missilecommandbase>

<http://makepixelart.com/artists/anonymous/missile-command---low-out>

LOW
Low Missile Warning

OUT
Out of Missiles Warning



Targeting Crosshair



Allied Missile Ammo (located under each silo)



City



Airplane



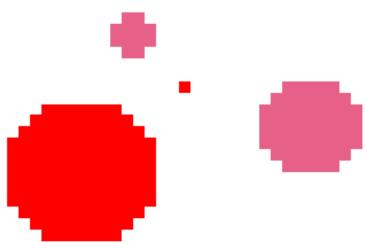
U.F.O.



Ground and Missile Silos



Missile Blast Sprites



- Allied Missile Sprite
- Enemy Missile Sprite



- The End Screen

Audio: All audio sound effects are reproduced using <http://www.bfxr.net>. Sound effects include, missile detonations, missile launches, low missile ammo warning, and the large game over explosion.

V. Sprint Planning:

Sprint planning will be done through the following google spreadsheet:

<https://docs.google.com/spreadsheets/d/1u1GR4enUbjLo6i2AUqkEjm5FM7L2UqHdHGU3Rm8RWBs/edit#gid=936750280>