Artificer MOBA Build Design Document

# Objectives

1. Add network connections between local and remote clients, simple verse maps
2. Update Menu UI to MOBA Replace single and multi player with ‘Find a game’ and ‘Quick Connect’

# Description

// Create new MOBA description

# Build Overview

Artificer MOBA will have the following play style

* 16 a side ship battles online
* Each team spawns with a large station on one side of the map
* Teams can set up base construction (A ship will travel from base to the build site and needs to be protected
* Ships spawn from main and forward bases
* Garage to build ships
* Player has free-look and ship follow, free look allows the mouse to drag the screen
* AI pirate groups and cargo escort groups
* Free floating wreckage generation
* Asteroid fields
* When player zooms out go to map view
* 10 templates to pick from when picking a ship before match

## After GreenLight

# Design Plan

## June

Following an unsuccessful greenlight and some UNET + Steamworks/.Net tutorials, I have decided to implement online functionality over June including matchmaking with steamworks and using UNET for creating peer to peer networking.

### Week Four - Creating Player ships on client/host

* Rethink ship structure
  + Make shipdata able to sync fully (20/06/16)
  + Create functional ships on all clients with ship generator (21/06/16)
  + Sync move and rotation (22/06/16)
  + Sync input keys across server (or make listener activation and deactivation as a [command] for visual effects (23/6/16)
    - Only localhost will show visible engines (23/6/16)
  + Fix mouse follow issue (23/6/16)
  + Show rotor effect syncing when turning rotor (23/6/16)
  + Firing weapon spawns projectile on server
    - Create projectilespawn obj with ProjectileSpawner script(23/6/16)
    - Create static function that accepts bullet prefab and weapon data for firing bullets (23/6/16)

## July

### Week One & two - Creating Player ships on client/host

* Create functional ships online
  + Firing weapon spawns projectile on server
    - Beam weapon is visible on client and server – add other projectiles later (4/7/16)
    - Instantiate and network spawn muzzle and impact sounds (4/7/16)
    - Projectiles successfully damage others. (7/7/16)
    - Sync damage (8/7/16)
      * Performance boost, see if components are damaged more than once (11/07/16)
    - Sync component destruction
      * Create a script that loops through each destroyed comp and physically remove them using the instance ID (12/7/16)
      * Create clientRPC and command to pass int array that then uses script mentioned above (12/7/16)
      * Create WreckagePrefab for network spawning (12/7/16)
      * Spawn WreckagePrefab to server (able to destroy) (12/7/16)
      * Add sync ability for child components on wreckage(12/7/16)
      * Performance boost and movement syncing(13/7/16)
  + Place projectiles in their own namespace(14/7/16)
  + Place ship scripts in their own namespace (14/7/16)
  + Network spawn to run on command function (15/07/16)
  + Write xml comments and regions in scripts (15/07/16)
  + Projectile sounds are applied at their correct position for volume
  + Clean ship attributes (15/07/16)
  + DPC implement Hit virtual functions (15/07/16)
  + Fix Projectiles hitting ship but not damaging individual components (15/07/16)

### Week Three – Custom Player Spawning

* Convert Contract Builder (19/07/16)
  + GameBuilder spawns players spawns and passes them to team spawner (19/07/16)
* Set teamspawner to spawn player at any spawn point (19/07/16)
  + Receives team spawns and when player is added, set spawn position to that at random (19/07/16)
  + Move if colliding with ship (20/7/16)
  + Min distance between spawn points (20/7/16)
* Team Spawner manages spawning player objects instead. (19/07/16)
* Use for respawning the player ship in the event of the ship being destroyed NetworkServer.ReplacePlayerForConnection() (19/07/16)

### Client Rpc Player spawing

* Add other ships to tracker GUI
  + Add tracker to tracking hud (21/07/16)
  + Create greyed out arrow for none tagged objects [temp](22/7/16)
  + Update TrackerHUD to show transforms, grey if no tag(22/7/16)

### Week four – Team objects and spawn displays

* Convert Contract Tracker to Game Tracker
  + Contained within Space object (25/7/16)
  + Create initialize function that will eventually take game parameters (25/7/16)
    - Starts the Game Builder Process, will do more later (25/7/16)
  + Create Team Class
    - Think about what team objects need
      * Which faction they are: three factions will exist in game
        + FactionData contains: (25/7/16)

FactionID : passed through parameters (25/7/16)

Faction Icon : texture of faction logo(25/7/16)

Faction Description (25/7/16)

Visual styles they can have: Each faction will have a unique appearance (25/7/16)

* + - * Currently available components: these will be unlocked as the team works together. (25/7/16)
      * Shared material data (26/7/16)
      * List of owned stations (27/07/16)
  + Create event that will return the game state (win or loss) that the space manager listens for (27/7/16)
  + Create event listeners that will listen for ship destroyed etc. (27/7/16)
  + Players don’t spawn right away
    - Game controller creates two teams consisting of random of the three factions . (28/7/16)
      * Create faction data importer and library. (28/7/16)
    - Game Controller stores reference to the player that joined within its attributes and prompts that client to choose a team.
      * Create a popup gui with team picker (28/7/16)
      * Set Single client to show that popup (28/7/16)
      * Teampicker needs to implement set teams (29/7/16)
      * Space manager game controller will store a refence to those teams rather than create them(29/7/16)
      * Selecting a team will send setplayerteam msg to game controller (1/8/16)

## August

### Week One – Team Objects and Spawn Point Selection

* TeamController Objects
  + Don’t store player info, Info will be passed from game controller when spawning. (1/8/16)
  + Create SpawnDialog.
    - Event listener listens for spawn button press (2/8/16)
    - Controller Adds spawn timer and enables button after allotted time(2/8/16)
    - More in future
  + In PlayerDeath display spawn screen. Spawnscreen will then call the gameMSG spawn player at. (2/8/16)
  + Draw symbols (5/8/16)
  + Team spawner uses spawn generator to build local playerspawn points that apply to the local player (4/8/16)
  + Fixes
    - Mouse over needs to cause image to slightly highlight (4/8/16)
    - Switch client selections to messages as commands don’t work (4/8/16)
  + Fix Teams
    - Teams don’t match (4/8/16)
    - Team spawns not in right pos(6/8/16)

### Week Two - Space Segment Generation

* Build Space data for segment object (8/8/16)
* Cycle segment and generate objects in range (8/8/16)
* Update segment structure
  + Initialize segment will spawn objects (server only) and then spawn them to server
    - Segment objects store netInstanceID
    - For now proceed as if we don’t destroy objects
    - Create segment objects as actual prefabs
      * Satellite prefab (9/8/16)
      * Asteroid prefab (10/8/16)
  + Cycle segment (rename generator) will enable the game object (maybe using netID) or recreate it depending on if we destroy the object or not (10/08/16)
  + Create segment object behaviour and create a procedure to disable or destroy the object when out of distance (9/8/16)
  + Blend all generators into one script with regions and it will keep reference to all sub GO in the scene (10/8/16)
  + Rename sub obj back to \_satellites (9/8/16)
  + Add asteroid disabled state (10/08/16)
  + Make syncspaceobjects sync (11/08/16)
  + Add hit functionality back to asteroids(11/08/16)
    - Create asteroidhit collider or asteroidbehaviour extends hit collider(11/08/16)
  + Create space cloud (12/8/16)
  + Improve segment object structure
    - Do not bother hiding segment obj if it does not have a sprite renderer or network transform (13/08/16)
    - Fix performance issues with coroutine (13/08/16)

### Week THREE - Space Segment Generation

* Update segment structure
  + Improve segment object structure
    - Space cloud particles clients (15/8/16)
    - Asteroid hit not working – client side hit detection (19/08/16)

### Week Four - Space Segment Generation

* + Create rubble texture and rubble field
    - Implement this into wreckage prefab
  + Include broken ship components and create ship graveyard
* Create camera add ons:
  + Create planet script
    - Stores list of planets and their moons position, these will be retrieved not generated
    - When player is close enough, spawn planet and make it move very slowly (when in range move ~0.001 depending on supposed difference
    - Do the same for moons
  + Galaxy script – works like planet script but with galaxy images on bigger scale

### team spawning

* Left side of spawn picker with have default ship choice, provided by teamcontrollers
* Change PlayerSpawn to TeamASpawn and TeamBSpawn and alinement labels custom spawn functionality
  + Create team spawner manager (takes team sizes as a variable) base class for different teams
  + Team spawner consists of three functions
    - Small teams (up to 32 players) – two station at opposite ends 200km away from each other, create TeamA and TeamB Spawns around these (don’t bother with two other functions yet)
      * Add Network Identities to station generator
    - Team Spawner Manager will store a dictionary<short, Transform> for current ships
    - And store <short, ShipData> for player accounts. Shot being client ID
  + Don’t sync alignment labels so some will be enemies and others will be friendly
* Store ship data within space attributes for player (ShipData PlayerShip)
* Delete any AI waypoints, contract specific station data

### Complex Segment Object

* Asteroids
  + Damage when hitting shit depends on velocity and mass
  + Create background asteroids
* Impact Collider
  + Hit damage area damage fades with difference
  + Redraw sprite when asteroid hit and create smaller fragments
* Components
  + Create destroyed component, break component sprites apart when destroyed
  + when ship destroyed, continue to break down components as opposed to destroying the whole ship

### Matchmaking

* Create chat message window
* Receive and process chat messages (ON HOLD)
* Test matchmaking with two computers
* Set every UI widget that displays user information to register for the PersonaStateChanged\_t callback, and update on any change.
* Make sure UNET can then take over with peer to peer networking.
* Add ability to kick players

### PlayerData and Stat Storage

* Create StatTracker– controller component with stat storage that’s responsible for keeping track of stats and updating steam. Get and sets
* Add player info in lobby list to display player stats

## Extra

### Server

* Create a new Artificer Project called Artificer Server (NetworkManager.StartServer()) This should possibly have all the same game assets? Possibly keep on same project with different scene.
* <http://www.alanzucconi.com/2015/09/02/a-practical-tutorial-to-hack-and-protect-unity-games/>
* <http://en.unity3d.netobf.com/Video_help>
* https://www.hackthis.co.uk/articles/game-hacking-chapter-1-unity3d-attack-by-reverse-engineering

<http://forum.unity3d.com/threads/unet-steamworks-final-connect.415474/>

<http://www.codeproject.com/Articles/807861/Open-NAT-A-NAT-Traversal-library-for-NET-and-Mono>

<https://github.com/lontivero/Open.NAT>

* Create normal map and assign it when creating component
* Not all sockets within proximity light up when connecting components in unity editor
* Add multi language support (Russian)
* Repair self components (maybe repair in a station)
* <https://docs.unity3d.com/Manual/UNetVisibility.html>
* <https://www.reddit.com/r/Unity3D/comments/3bbk1y/help_with_unity_networking/csn4avc>
* <https://docs.unity3d.com/Manual/class-NetworkProximityChecker.htm>
* <https://docs.unity3d.com/ScriptReference/Networking.ClientScene.Ready.html>