HC Installation and Setup Guide for A3XAI

Last updated: October 4, 2015

Introduction

A Headless Client can be used by missions to offload AI processing to a dedicated client, freeing up the dedicated server process from most AI processing. Thus more AI units can be spawned and the server process will be able to dedicate most of its processing towards communication with the clients. For a Headless Client/Dedicated Server to function together efficiently, they both need to be connected to each other via extremely low latency and high bandwidth. Effectively, they need to be on the same LAN at least, but preferably running on the same computer.

Source: https://community.bistudio.com/wiki/Arma_3_Dedicated_Server#Headless_Client

If the Arma 3 Headless Client and a Arma 3 Dedicated Server are running on the same Windows computer (VM or physical), it may be beneficial to set processor affinity to prevent execution intensive threads from being scheduled across the same (v)CPUs. The operating system will generally schedule threads efficiently, but manual CPU allocation is possible. This can be achieved by right-clicking on the process (e.g. Arma3Server.exe(*32)) in the processes tab of the Windows Task Manager and selecting Set Affinity.... Be aware that on a physical intel CPU, the odd numbered CPUs are Hyper-thread cores.

Note: You can use automated solution for affinity assign via batch file with commandline CMD /AFFINITY HEXvalue e.g. CMD /C START /AFFINITY 0xF3 arma3server.exe

It has been observed that although the ARMA server and client processes will kick off multiple threads, the bulk of processing is used up by only one or two threads. For example, spawning 50 AI units does not generate 50 threads. There is one thread in the process that handles all of the AI units, irrespective of how many have been spawned. In this way, the ARMA server and client processes do not make maximal use of the processing capability found in modern processors and so AI counts do not scale easily. As such, faster CPU core speed is king and offloading the AI to multiple headless clients on the same computer will probably produce the best possible results for complex missions involving many AI units (albeit an expensive way to get the results).

Source:
https://community.bistudio.com/wiki/Arma_3_Dedicated_Server#Headless_Client_on_a_Dedicated_Server_Notes

Required/Recommended Tools:

1. Notepad ++ (Recommended): https://notepad-plus-plus.org/download/
2. Eliteness (Required): https://dev.withsix.com/projects/mikero-pbodll/files
3. PBO Manager (Required): http://www.armaholic.com/page.php?id=16369

Note: If you already have a basic headless client set-up, skip to Part B to set up an HC for A3XAI

Part A: Set up Headless Client

1. Edit your server's config.sqf using a text editor

- Recommended to use **Notepad++** (Notepad++ will be used in this guide).
- Typically, config.sqf is located in /@ExileServer/config.cfg

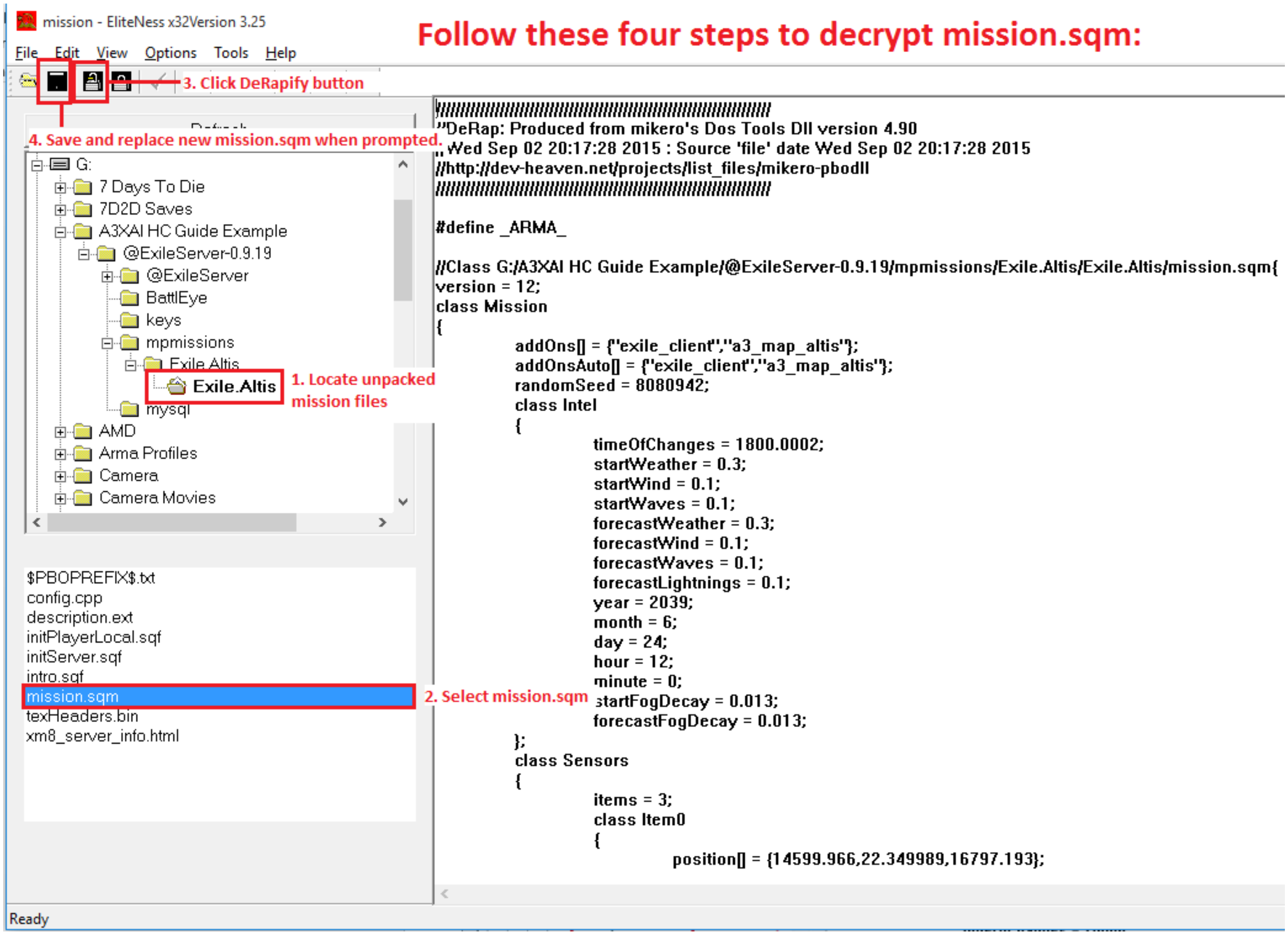
2. Add the following lines to the end of this file.

```
localClient[]={127.0.0.1};

headlessClients[] = {"127.0.0.1"};

battleyeLicense=1;
```

- If you are running your headless client from a different physical machine on a LAN or VM, add its IP to localClient[] and headlessClients[].
- It is recommended to run your HC on the same physical machine to minimize latency and maximize bandwidth between dedicated server and HC.

- From most ideal to least ideal dedicated/headless client setup (red indicates setups that should be avoided)
    - HC on same physical machine and environment as dedicated server
        - Minimal added latency, maximum bandwidth. **Recommended.**
    - HC running on a different physical machine on same LAN as dedicated server
        - More added latency compared to above scenarios
    - HC running on a different physical machine, not connected to the dedicated server by a LAN
        - Much higher latency, high bandwidth requirement may cause issues with other players compared to above scenarios. **Not recommended.**

3. Using **Eliteness**, open your mission.sqm and decrypt mission.sqm using the below guide.



Follow these four steps to decrypt mission.sqm:

1. Locate unpacked mission files

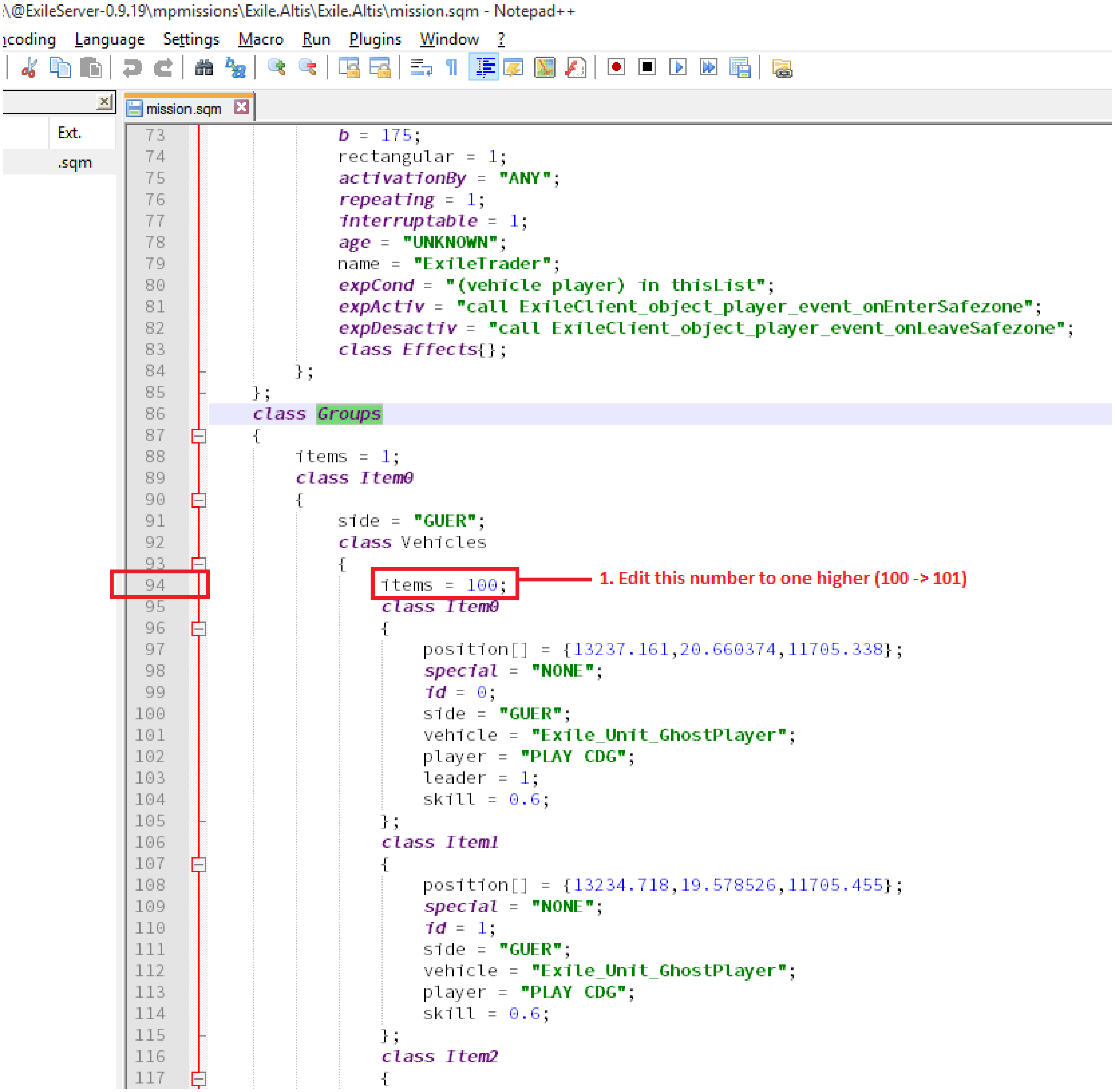
2. Select mission.sqm

3. Click DeRapify button

4. Save and replace new mission.sqm when prompted.

```
////////////////////////////////////////////////////////////////////
//DeRap: Produced from mikero's Dos Tools Dll version 4.90
//Wed Sep 02 20:17:28 2015 : Source 'file' date Wed Sep 02 20:17:28 2015
//http://dev-heaven.net/projects/list_files/mikero-pbodll
////////////////////////////////////////////////////////////////////

#define _ARMA_

//Class G:/A3XAI HC Guide Example/@ExileServer-0.9.19/mpmissions/Exile.Altis/Exile.Altis/mission.sqm{
version = 12;
class Mission
{
		addOns[] = {"exile_client","a3_map_altis"};
		addOnsAuto[] = {"exile_client","a3_map_altis"};
		randomSeed = 8080942;
		class Intel
		{
				timeOfChanges = 1800.0002;
				startWeather = 0.3;
				startWind = 0.1;
				startWaves = 0.1;
				forecastWeather = 0.3;
				forecastWind = 0.1;
				forecastWaves = 0.1;
				forecastLightnings = 0.1;
				year = 2039;
				month = 6;
				day = 24;
				hour = 12;
				minute = 0;
				startFogDecay = 0.013;
				forecastFogDecay = 0.013;
		};
		class Sensors
		{
				items = 3;
				class Item0
				{
						position[] = {14599.966,22.349989,16797.193};
```

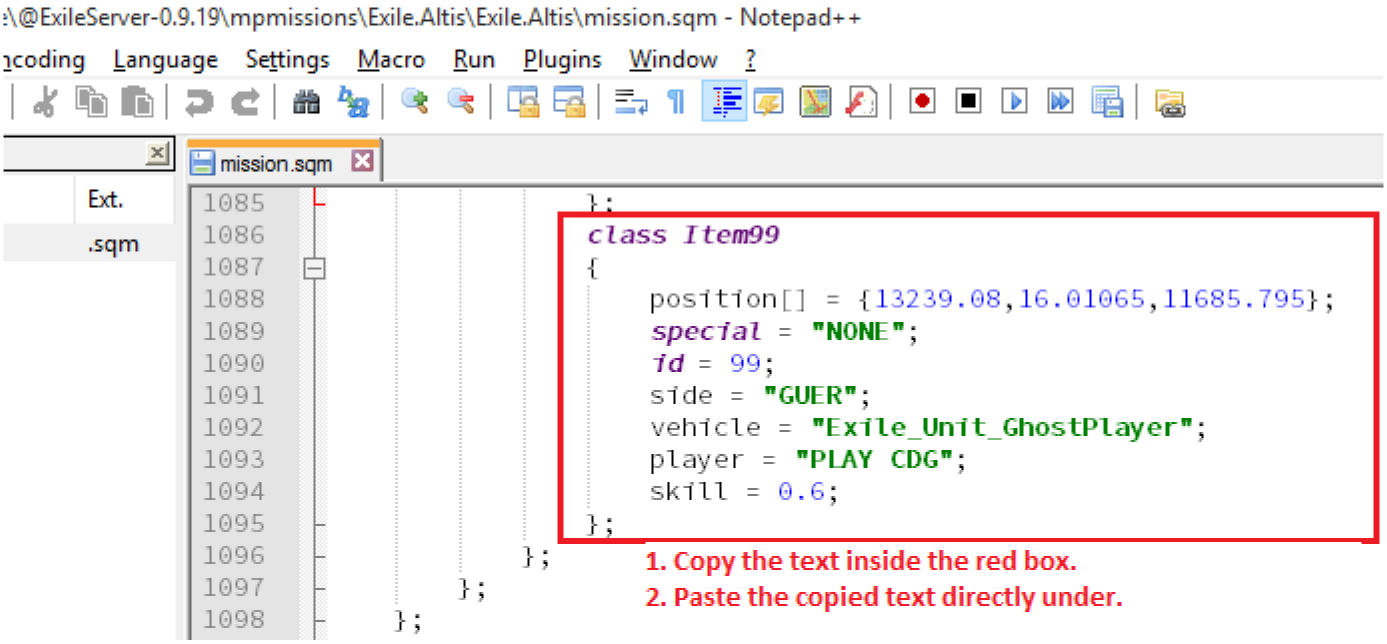
5. Using **Notepad++**, edit the decrypted mission.sqm using the below guide.


\@ExileServer-0.9.19\mpmissions\Exile.Altis\Exile.Altis\mission.sqm - Notepad++
ıcoding Language Settings Macro Run Plugins Window ?
mission.sqm
Ext.
.sqm

```
            b = 175;
            rectangular = 1;
            activationBy = "ANY";
            repeating = 1;
            interruptable = 1;
            age = "UNKNOWN";
            name = "ExileTrader";
            expCond = "(vehicle player) in thisList";
            expActiv = "call ExileClient_object_player_event_onEnterSafezone";
            expDesactiv = "call ExileClient_object_player_event_onLeaveSafezone";
            class Effects{};
        };
    };
    class Groups
    {
        items = 1;
        class Item0
        {
            side = "GUER";
            class Vehicles
            {
                items = 100;
                class Item0
                {
                    position[] = {13237.161,20.660374,11705.338};
                    special = "NONE";
                    id = 0;
                    side = "GUER";
                    vehicle = "Exile_Unit_GhostPlayer";
                    player = "PLAY CDG";
                    leader = 1;
                    skill = 0.6;
                };
                class Item1
                {
                    position[] = {13234.718,19.578526,11705.455};
                    special = "NONE";
                    id = 1;
                    side = "GUER";
                    vehicle = "Exile_Unit_GhostPlayer";
                    player = "PLAY CDG";
                    skill = 0.6;
                };
                class Item2
                {
```

1. Edit this number to one higher (100 -> 101)

Then, further down the file at about **Line 1086**:


:\@ExileServer-0.9.19\mpmissions\Exile.Altis\Exile.Altis\mission.sqm - Notepad++
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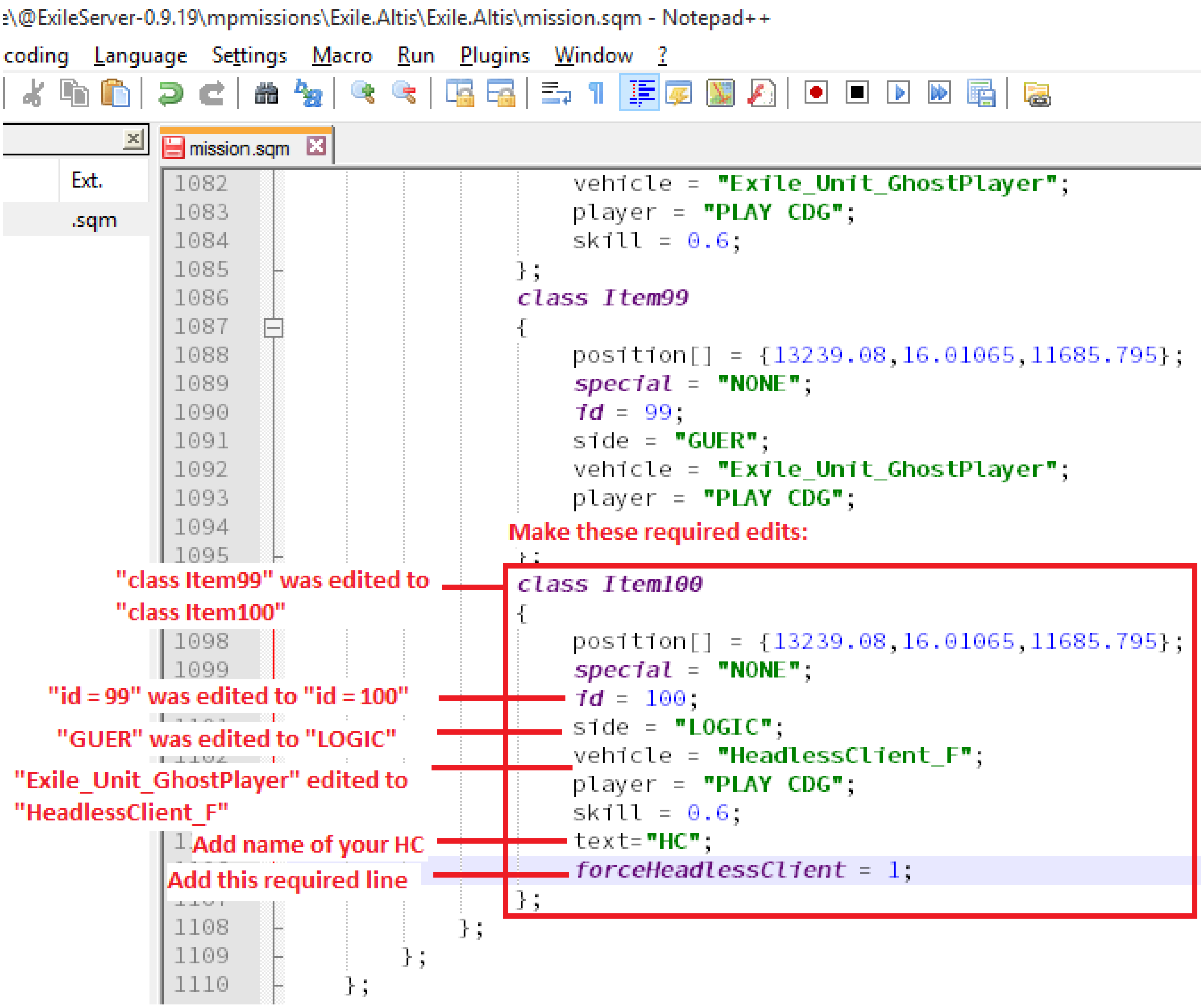
mission.sqm

```
1085                        };
1086                        class Item99
1087                        {
1088                            position[] = {13239.08,16.01065,11685.795};
1089                            special = "NONE";
1090                            id = 99;
1091                            side = "GUER";
1092                            vehicle = "Exile_Unit_GhostPlayer";
1093                            player = "PLAY CDG";
1094                            skill = 0.6;
1095                        };
1096                    };
1097                };
1098            };
```

1. Copy the text inside the red box.
2. Paste the copied text directly under.

Edit the copied block of text, so it looks like this:



:\@ExileServer-0.9.19\mpmissions\Exile.Altis\Exile.Altis\mission.sqm - Notepad++
coding
Language
Settings
Macro
Run
Plugins
Window
?
mission.sqm
Ext.
.sqm

```
        vehicle = "Exile_Unit_GhostPlayer";
        player = "PLAY CDG";
        skill = 0.6;
    };
    class Item99
    {
        position[] = {13239.08,16.01065,11685.795};
        special = "NONE";
        id = 99;
        side = "GUER";
        vehicle = "Exile_Unit_GhostPlayer";
        player = "PLAY CDG";
    };
    class Item100
    {
        position[] = {13239.08,16.01065,11685.795};
        special = "NONE";
        id = 100;
        side = "LOGIC";
        vehicle = "HeadlessClient_F";
        player = "PLAY CDG";
        skill = 0.6;
        text="HC";
        forceHeadlessClient = 1;
    };
   };
  };
 };
```

Make these required edits:

"class Item99" was edited to "class Item100"

"id = 99" was edited to "id = 100"

"GUER" was edited to "LOGIC"

"Exile_Unit_GhostPlayer" edited to "HeadlessClient_F"

Add name of your HC

Add this required line

IMPORTANT: You <u>must</u> have one HC slot for each addon on your server that uses an HC. Failing to do this will cause HCs after the first connected one to fail to connect.

6. If your mission files are kept in a pbo, repack the mission files into pbo format. Otherwise, installation of the HC is done. Your next step is now to set up A3XAI on your HC (Part B).

Part B: Set up A3XAI HC

1. Copy the @A3XAI_HC folder from the downloaded install package, inside the “6. Headless Client” folder.
2. Paste the @A3XAI_HC folder into your Arma 3 directory.
3. Open @A3XAI_HC/Keys.
4. Copy A3XAI.bikey to your server's Keys folder.
5. Edit your mission.sqm and add a new HC slot **(This should have been done in Part A)**
6. In @A3XAI >> A3XAI_config.pbo >> config.cpp, set **enableHC = 1;** (You will need to unpack A3XAI_config.pbo to access config.cpp).
7. Repack A3XAI_config.pbo.
8. Start the HC by starting arma3server with these parameters: -client -mod=@Exile;@A3XAI_HC;

Part C: Things to note

1. It should not matter whether you start your dedicated server or headless client first.
2. You may start, close, or restart your HC at any time while A3XAI is running on your dedicated server without issues.
3. A3XAI will transfer AI groups from the dedicated server to the headless client gradually (1 group per 5 seconds) until all have been transferred.
4. A3XAI’s HC will only manage AI units that A3XAI (on the dedicated server) has spawned, **not** AI from other mods or addons.
5. Dedicated server will handle A3XAI’s background tasks and AI spawning, while the HC will handle AI behavior directly.

Part D: Verifying HC is running normally

Inside your server's RPT log, you will see that the HC has successfully connected when you see this:

```
"[A3XAI] Headless client L Charlie 1-2:1 REMOTE (owner: 4) logged in successfully."
```

Inside your HC's RPT log, you will see this (it won't be this clean, but this is what you're looking for):

```
22:17:06 "[A3XAI] Initializing A3XAI HC build 0.1.8 using base path A3XAI."
22:17:06 "[A3XAI] Waiting for HC player object setup to be completed."
22:17:07 "[A3XAI] Attempting to connect to A3XAI server..."
22:17:08 "[A3XAI] Loaded all A3XAI settings in 0.000999451 seconds."
22:17:08 "[A3XAI] Headless client connection successful. HC authorization request granted."
22:17:09 "[A3XAI] Compiling functions..."
22:17:09 "[A3XAI] A3XAI HC functions loaded."
22:17:09 "[A3XAI] Compiling A3XAI functions."
22:17:09 "[A3XAI] A3XAI functions compiled."
22:17:09 "[A3XAI] A3XAI HC PVEHs loaded."
22:17:09 "[A3XAI] A3XAI HC started with Debug Level: 2."
```

Part E: What to expect in the HC’s RPT log

When you read your HC’s RPT log, you will see some errors related to “color corrections” and “oxygen remaining”. These are harmless errors and will not affect your HC’s ability to function properly (example: a headless client has no graphical interface, so any error about colors is completely irrelevant).

Besides the usual “Object not found” errors, here are examples of “harmless errors” that you can expect in the HC’s RPT log and that you should not be worried about:

```
22:16:59 Error: Bone world root doesn't exist in skeleton OFP2_ManSkeleton

22:16:59 Error: Bone hips doesn't exist in skeleton OFP2_ManSkeleton

22:17:06 Error in expression <ffectCreate ["ColorCorrections", 1600];

22:17:06   Error position: <BIS_TotDesatCC ppEffectAdjust [1,1,0,[0,>

22:17:06   Error Undefined variable in expression: bis_totdesatcc

22:17:06 Error in expression <tOxygenRemaining player;

22:17:06   Error position: <BIS_SuffCC ppEffectAdjust [1,1,0,[0.0090>

22:17:06   Error Undefined variable in expression: bis_suffcc
```