



VR-Engage

First Experience

Version 1.3

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1. Introduction to VR-Engage

Thank you for deciding to try out VR-Engage. VR-Engage is a multi-role virtual simulator developed for use in training simulations or laboratory experimentation. VR-Engage lets users play the role of a first person human character, a ground vehicle driver, gunner or commander, or the pilot of a fixed wing aircraft or helicopter.

VR-Engage is built with the game quality 3D graphics of VR-Vantage, the simulation engine from VR-Forces, and the network interoperability of VR-Link. VR-Engage is a stand-alone application. It can interoperate with any simulation using DIS or HLA. However, when installed with a compatible version of VR-Forces, you can reap the benefits of their common system architecture, including scenario creation, terrain agility, common terrains, models, and configurations, and common representation of the environment.

Before you begin, install and license the software. Please see Section A.1, [“Installing VR-Engage,”](#) for instructions. If you want to control ground vehicles or aircraft, you must connect a game controller. VR-Engage is configured for the Logitech F310 and F710 game controllers and the G27 and G29 steering wheels. It also supports the Thrustmaster HOTAS Warthog™ flight controller and the T.Flight Hotas X. Please contact support@mak.com for help configuring other DirectInput devices.

This First Experience guide is designed to give you a successful first experience with VR-Engage. It guides you through a series of activities that demonstrate many of the features of the application without bogging you down in the minutiae of all of its capabilities.

VR-Engage includes the following example scenarios:

- ♦ VR-Engage Test Drive. VR-Engage Test Drive is a simple scenario that lets you practice controlling the four basic types of players in VR-Engage – humans, ground vehicles, helicopters, and airplanes. Humans and ground vehicles are pretty easy to control, but aircraft can be a bit tricky if you have not played with a flight simulator before.

Once you feel confident controlling the different player types, or if you already feel confident and want to skip the test drive, you can move on to VR-Engage First Experience, which introduces you to the most frequently used VR-Engage capabilities.

- ♦ VR-Engage First Experience. A scenario with many different entities that shows off the capabilities of VR-Engage, such as firing weapons, embarking on and disembarking from entities, parachuting, and air-to-air combat.
- ♦ VR-Engage Security Checkpoint. An example of how you can customize VR-Engage with new entity types to create a focused training environment.
- ♦ MAK Suite Demo California. This is a complex scenario that MAK uses to demonstrate the features of VR-Engage and how MAK products work together to create compelling simulations for training.
- ♦ VR-Engage T-38. This scenario has several T-38 C Talon aircraft flying in formation. It is used to demonstrate the mixed reality capability of VR-Engage.



The tutorials in this manual require you to run VR-Forces scenarios. You must have a VR-Forces simulation engine license to run the scenarios. The VR-Engage product does not include a VR-Forces license.

If you do not have a VR-Forces license, you can run VR-Engage, choose a terrain database to simulate on, create and place an entity, and control that entity. VR-Engage can only simulate and control a single entity at a time. When you change role and create a different entity to simulate, the entity you were previously simulating is deleted and replaced by the new one.

For details about license issues, please see Section 1.5.3, “[License Requirements for Hosting a VR-Forces Session](#),” in *VR-Engage Users Guide*.



2. VR-Engage Test Drive

This chapter introduces the VR-Engage Test Drive scenario. This scenario has a human, a light armored vehicle (LAV), a helicopter, and two jets, one in the air and the other on a runway. It provides a simple environment in which you can practice controlling them using the keyboard, Gamepad, or joystick. Once you feel comfortable controlling characters, you can try the VR-Engage First Experience scenario, which teaches you how to control a character that is interacting with other characters in the simulation.



The Gamepad and joystick illustrations in this chapter show a subset of the available controls that focus on driving or flying the vehicles. For a complete list of controls, please see Chapter 6, *Mouse, Keypad, and Controller Mappings*.

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2.1. Start VR-Engage and Load the Test Drive Scenario

1. On Windows 10, on the Start menu, choose **MAK Technologies** → **VR-Engage**. (If you just have a license for VR-Engage Ground or VR-Engage Air, choose that instead of VR-Engage.)

The VR-Engage window opens. The Searching for Session screen opens (Figure 2-1).

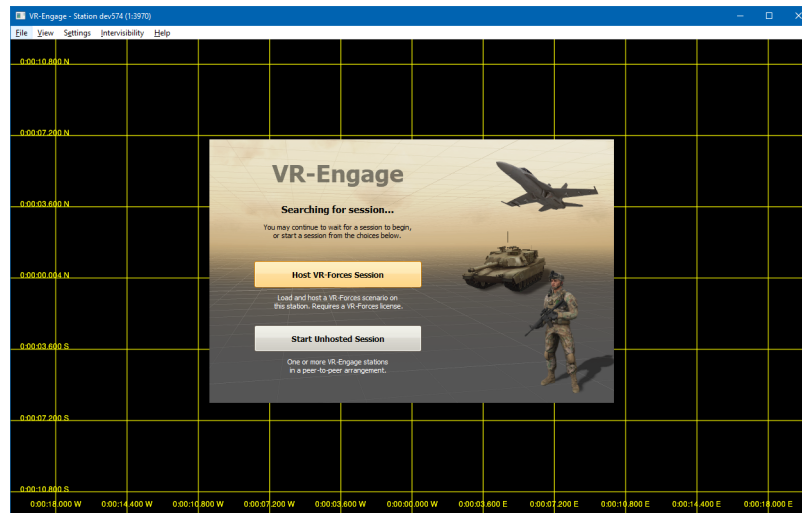


Figure 2-1. Searching for Session



When you start VR-Engage, it looks for an instance of VR-Engage that is already running or an instance of VR-Forces that is running. If it finds one, it immediately connects to that session, loads the terrain it is using, and then asks you what character you want to control. If it does not find a session, it stops and asks you what to do.

If you run VR-Engage Ground or VR-Engage Air, the characters available to you are limited to ground or air.

2. Click Host VR-Forces Session. This option lets you load a scenario that was created using VR-Forces and is provided with VR-Engage. The Host a VR-Forces Session dialog box opens (Figure 2-2).

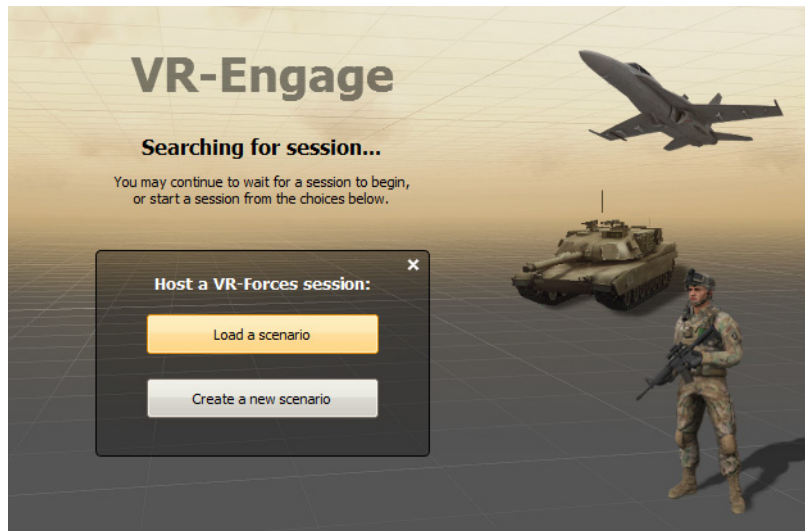


Figure 2-2. Host a VR-Forces session dialog box

3. Click Load a Scenario. The Choose a Scenario for this Session dialog box opens (Figure 2-3).

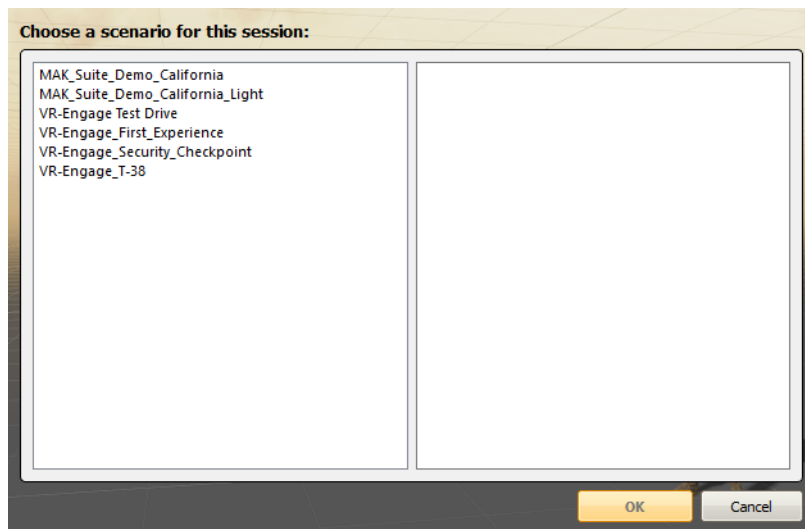


Figure 2-3. Choose a scenario for this session dialog box

4. Select VR-Engage Test Drive.
5. Click OK. The terrain and scenario load. The Choose Role Panel is displayed (Figure 2-4). It lists the characters that are in the scenario.

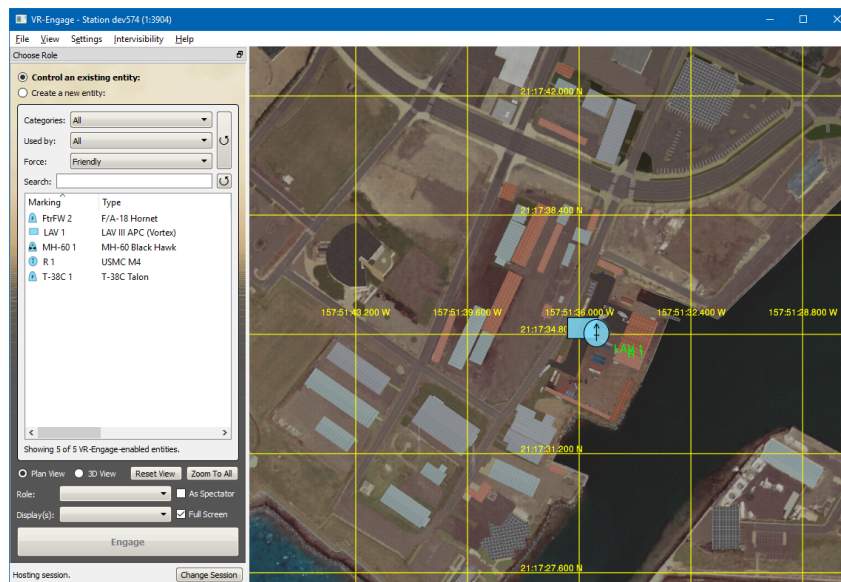


Figure 2-4. Choose Role Panel

2.2. Test Drive a Human

1. In the Choose Role Panel, select the Control an Existing Entity option.
2. In the list of entities, select R1.
3. Click Engage. The display changes to full screen mode and the scenario starts to run.

Figure 2-5 shows the R1 (USMC M4) when you first engage it.



Figure 2-5. R1 USMC 1st person view

Refer to [Figure 2-6](#) for the Gamepad movement controls for humans.

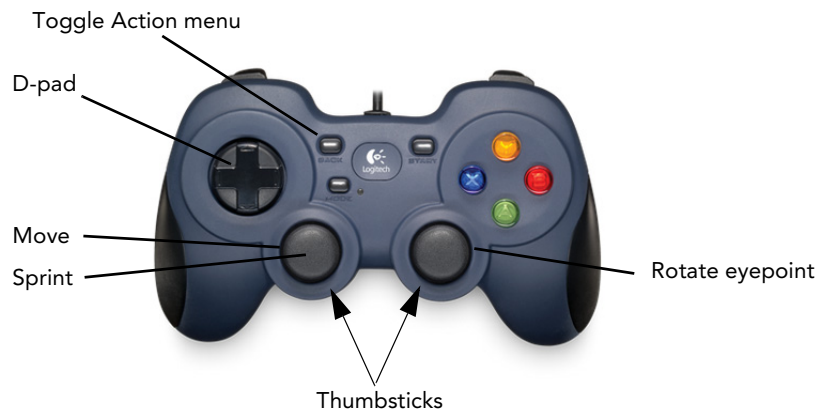


Figure 2-6. Human controls

2.2.1. Walking Around

Walking around requires coordination of the thumbsticks on the Gamepad, or movement keys on the keyboard.

To walk, push the left thumbstick in the direction that you want to go, or press the **W** (forward), **A** (left), **S** (backward), and **D** (right) keys. When you walk to the left or right, the character continues to face forward.



Figure 2-7. Primary movement keys, observer coordinates (3D)

To change orientation (turn), push the right thumbstick to the left or right, or press the **Left Arrow** and **Right Arrow** keys. (In 1st-person mode, pushing the right thumbstick forward or back (or pressing the **Up Arrow** and **Down Arrow** keys) causes the character to look up or down. In 3rd-person mode, the view rotates around the character.)

2.2.2. Walk Around the Warehouse Area

Walk around the warehouse area to practice using the movement controls. [Figure 2-8](#) shows the location of the R1 USMC and its relationship to the warehouse when you first engage it.



Figure 2-8. Warehouse area

Walk into the bays on the left side of the warehouse. Walk up the steps on the right side.

When you walk up the steps, go into the hallway and try going in and out of the rooms. Getting your character lined up on the steps and through the doorways is tricky until you start to coordinate movement and orientation.

When you are finished walking around, walk back out to the warehouse parking lot where you started and walk towards the large green vehicle (a light-armored vehicle, or LAV) that is parked there. When you get close to the LAV, the Embark LAV menu is displayed ([Figure 2-9](#)).

If you want to test drive the LAV, go to the next section in this chapter. Otherwise, press **ESC** two times to exit to the Choose Role Panel.

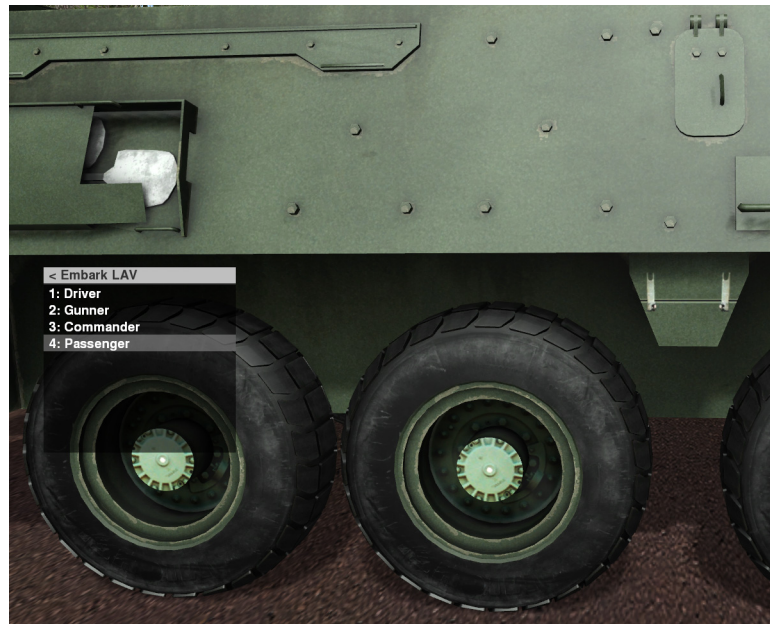


Figure 2-9. Embark LAV menu

2.2.3. Resetting Entities to Saved Position

While you are moving entities around the scenario, you can choose to reset them to the saved position where you started. Use this when you encounter a problem such as crashing a vehicle.

To reset the entity to the saved position:

1. Press ~ to open the Action menu.
2. Choose **Reset**.

You return to your starting position ([Figure 2-5](#)).



You can also save a new starting position by opening the Action menu and choosing Reset in Place. New saved positions apply to the current session; when you load a new session, the entities always start at the original positions defined in the scenario.

2.3. Test Drive a Ground Vehicle

To drive the LAV, you must embark in the Driver role. If you are continuing from the previous section, on the Action menu, select Driver. There are several ways to activate menu commands. In this case, just press **1**. (You can also choose this role in the Choose Role Panel.)

[Figure 2-10](#) shows the driver view.



Figure 2-10. LAV driver view

The overlay has some important information that you will need to be aware of as you drive. In the lower left corner it displays the speed and gear.

Refer to [Figure 2-11](#) for ground vehicle driver controls on the Gamepad.



Figure 2-11. Driver controls for LAV and M1A2

To drive a ground vehicle, you must:

1. Start the engine.
2. Put the vehicle in gear.
3. Use the Gamepad thumbsticks to control the throttle (forward, backward, and braking) and steering. (You can also control the LAV, but not other ground vehicles, from the keyboard.)

2.3.1. Starting the Engine

To start the engine, do one of the following:

- ♦ On the Gamepad, press the Start button.
- ♦ On the Racing Wheel Controller, press the Engine On button.
- ♦ Press **X**.

2.3.2. Putting the Vehicle into Gear

The LAV has eight forward gears and one reverse gear.

- To put the vehicle into gear, press the Gear Up or Gear Down buttons on your gaming controller or press **Q** (up) or **E** (down).

2.3.3. Controlling the Throttle

- To move the vehicle, press the throttle control (left thumbstick on the Gamepad) forward or press **W**.

If you are driving using a Racing Wheel Controller, use the gas and brake pedals.

- To brake the vehicle, pull the throttle control backwards.

2.3.4. Steering a Vehicle

- To steer the vehicle, use the right thumbstick on a Gamepad or the steering wheel of the racing wheel controller. (You can also press **A** (left) or **D** (right).)

2.3.5. Driving the LAV

1. When you put the LAV in gear, it starts to move. Drive the LAV forward and turn left to go through the gate. [Figure 2-12](#) shows where the LAV is located in the parking lot. The exit gate is at the end of the lot. The left turn to the gate is a bit tight. You might have to go into reverse to maneuver. Use the gear buttons to do that.

By default, you are in first-person mode as the driver. To get a better sense of where the LAV is in relationship to the terrain, you can repeatedly press the Y button on the Gamepad to get different views of the LAV.



Figure 2-12. LAV 3rd person view

2. When you exit the gate, turn right and drive up to the corner.
3. At the intersection turn left.
4. Drive all the way down this street until you get to the dock area. You will see a helicopter sitting in the middle of the tarmac ([Figure 2-13](#)).



Figure 2-13. Helicopter on tarmac

5. Drive to within walking distance of the helicopter.
6. Pull back on the throttle and turn off the engine.
7. Press **~** to open the Action menu.
8. With your mouse, click Disembark. You are now back in control of the human character you started with.
9. Press **ESC** to close the Embark LAV menu.
10. If you want to test drive the helicopter, walk towards it until you see the Embark menu. It's a long walk, so hold down **Shift + W** to run instead of walking (**W**). When you get close to the helicopter, the Embark Helo menu opens. Click Pilot to embark as the pilot. Then go to the next section in this guide.

If you do not want to test drive the helicopter now, press **ESC** once or twice to exit to the Choose Role Panel. Or, go back to the LAV and practice driving some more.

2.4. Test Drive a Helicopter

You can fly a helicopter using a Gamepad or a joystick. A joystick provides more control than a Gamepad. [Figure 2-14](#) and [Figure 2-15](#) illustrate the controls for the T. Flight Hotas X joystick and the Gamepad. For more details and mappings for the Thrustmaster HOTAS Warthog, please see “[Flight Controllers](#),” on page 6-11.

The controls have the following effects:

- ♦ Collective. Changes the lift of the main rotor system in a uniform manner causing the aircraft to move up or down.
- ♦ Pedal. Changes the thrust of the anti-torque rotor allowing for changes to yaw (heading).
- ♦ Cyclic (pitch and roll). Changes the lift in the main rotor system in the direction of the cyclic input causing the aircraft to move in that direction.

When pitch and roll are 0, the helicopter hovers. When they are some other value, the helicopter flies in the direction of combined pitch and roll.

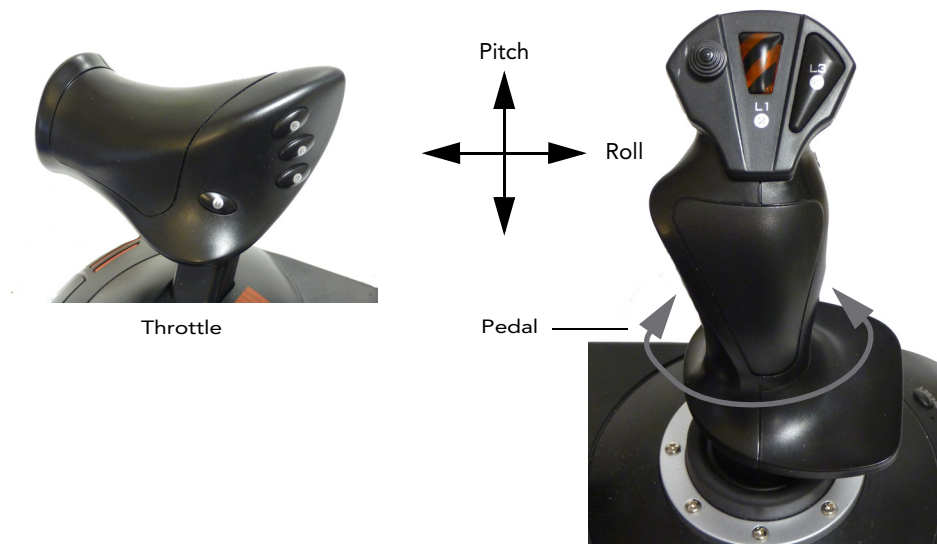


Figure 2-14. Fixed-wing T.Flight Hotas X joystick - rotary-wing



Figure 2-15. Gamepad rotary-wing flight controls

We will start our test drive by practicing a simple take-off and landing.

1. If you did not embark on the helicopter after your drive in the LAV, in the Choose Role Panel, select the Control an Existing Entity option.
2. In the list of entities, select MH-60 Blackhawk.
3. Click Engage. The display changes to full screen mode and the scenario starts to run. The helicopter is on the ground. The display shows the pilot view and an instrument panel (Figure 2-16). Take a minute or two to understand the layout of the instrument panel and the head-up display (HUD).



Figure 2-16. Helicopter cockpit

4. Pull back on the joystick throttle or the left thumbstick on the Gamepad. This controls the collective and makes the helicopter take off. Have it rise 100 meters and then try to hover. Hovering requires you to provide just enough lift so that the helicopter neither rises or falls.
5. Reduce the lift a bit so that the helicopter starts to drop down.

6. Try to drop slowly for a gentle landing.
7. If the helicopter crashes, which is likely until you get the feel of flying it, you can restore it as follows:
 - a. Press ~ or the Back button on the Gamepad to open the Action menu.
 - b. Use the D-pad or the arrow keys to select Reset.
 - c. Press D-pad right, the **Right Arrow** key, or **ENTER** to reset the helicopter.
8. Repeat this exercise until you feel comfortable with the simple takeoff and landing.

2.4.1. Change the Helicopter's Heading

Try a simple change to the helicopter without flying anywhere.

1. Fly the helicopter up to 100 meters.
2. Use the pedal (twist the joystick or push the left thumbstick to the left and right) to change the helicopter's heading. Remember to use the collective to maintain altitude.
3. Land the helicopter.

2.4.2. Fly the Helicopter

Now try to take off, fly someplace, and land. Flying a helicopter is not easy. Practice as much as you want.

1. Increase lift to take off.
2. Turn the helicopter to look out over the terrain.
3. Identify a flat area to fly to and land.
4. Push the joystick or right thumbstick forward to pitch the helicopter in that direction and fly forward.
5. Adjust pitch and roll to make turns.
6. When you are over the area where you want to land, bring the pitch back to horizontal, reduce lift and land.



If you land on uneven ground, the helicopter may roll downhill. To stop movement, on the Gamepad, press the X button (the wheel brake).

When you are done flying the helicopter, you can disembark and go back to playing the human role, or you can press **ESC** to exit to the Choose Role Panel.

2.5. Test Drive a Fighter Jet

The Test Drive scenario has a jet on a runway so that you can practice taking off. It also has one that is already airborne so you can practice flying (just in case you have problems taking off). You can use either of them to practice landing. [Figure 2-17](#) illustrates the flight controls for the T.Flight Hotas X joystick. This controller also has a throttle control. [Figure 2-18](#) illustrates the flight controls for a Logitech Gamepad.

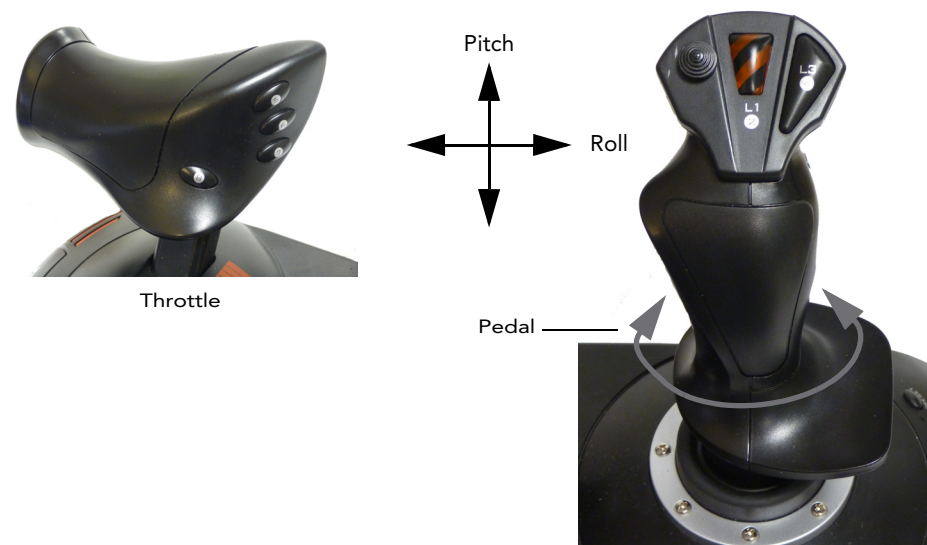


Figure 2-17. Fixed-wing T.Flight Hotas X joystick - fixed wing



Figure 2-18. Fixed-wing flight controls

The Action menu has options for raising and lowering landing gear and flaps. [Figure 2-19](#) shows the head up display and instrument panel for a fixed-wing aircraft. If you skipped the helicopter section, take a minute or two to understand the layout of the instrument panel and the head-up display.

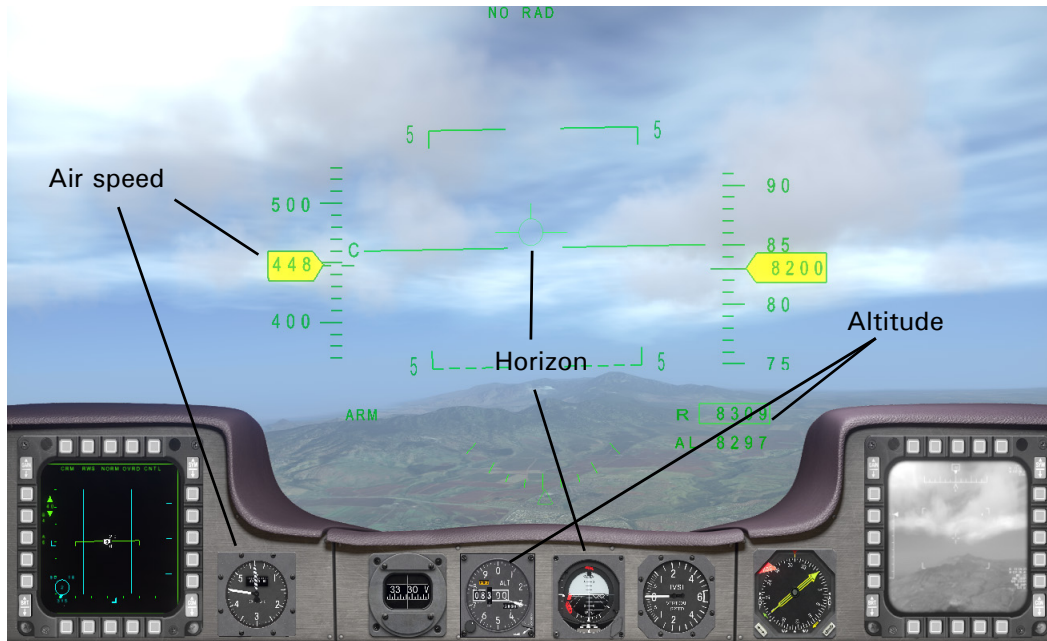


Figure 2-19. Fixed-wing head up display and instrument panel

2.5.1. Practice Flying an Airplane

We will start by practicing how to fly a plane that is in the air. You will need to know how to do that once you take off and before you can land.

1. In the Choose Role Panel, select the Control an Existing Entity option.
2. In the list of entities, select T-38C 1.
3. Click Engage. The display changes to full screen mode and the scenario starts to run. The jet is orbiting over the Honolulu area ([Figure 2-20](#)).



Figure 2-20. T-38 orbiting

4. Fly around Oahu, changing air speed, altitude, and heading, as follows:
 - a. Move the throttle or the left thumbstick forward to increase your air speed. Pull them back to reduce air speed.
 - b. Move the joystick or the right thumbstick forward and back to control the elevator on the aircraft. This changes the pitch up or down. If the aircraft is level, this results in an increase or decrease in altitude.
 - c. Move the left thumbstick right or left, or twist the joystick to control the ailerons. This causes the aircraft to bank left or right.
 - d. Refer to the head up display or the instrument panel ([Figure 2-19](#)) to determine your speed, pitch, and roll.

2.5.2. Practice Taking Off and Landing

The jet on the runway has its flaps up. If you want to shorten the distance required to take off, you can use the Action menu to lower the flaps. However, this is not required, since the runway is more than long enough for a fighter jet to take off.

To take off:

1. In the Choose Role Panel, select the Control an Existing Entity option.
2. In the list of entities, select FtrFW 2.
3. Click Engage. The display changes to full screen mode and the scenario starts to run. The jet is on the runway at the Honolulu airport.
4. Use the throttle to accelerate down the runway. Takeoff speed is about 150 mph, less if you lower the flaps.
5. When you reach takeoff speed, pull back on the joystick or use the Gamepad pitch control to raise the nose. The plane takes off.
6. Press **G** or use the Action menu to raise the landing gear.
7. Fly the plane as desired.

To land the jet:

1. Fly around Honolulu until you can line up the aircraft with the runway.
2. Press **G** or use the Action menu to lower the landing gear.
3. Use the Action menu or Gamepad Y button to lower the flaps. This reduces speed and also lowers the speed at which the aircraft will stall, thereby giving you more leeway for landing.
4. Reduce speed and lower altitude as you approach the runway. To reduce speed, pull back on the throttle, use the air brake (A button on the Gamepad), or both. The goal is to get below takeoff speed and go as slowly as possible without stalling.
5. Touch down on the runway, keeping the nose higher than the rear of the plane so that the rear wheels touch down first.
6. Use the wheel brake to stop the plane.



This is all much easier to say than to do. You will have to practice until you get a feel for how the plane handles.



3. VR-Engage First Experience Scenario

This first experience assumes that you have some familiarity with using a Logitech Gamepad or a joystick to control vehicles and people in a first-person simulation. If you have not used a game controller before, especially for controlling aircraft, you might want to practice a little bit before trying the experiences in this chapter. Please see Chapter 2, *VR-Engage Test Drive* for an introduction to controlling humans, ground vehicles, helicopters, and jets. (This chapter repeats some of the information presented in Chapter 2.)

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3.1. Start VR-Engage and Load a Scenario

When you start VR-Engage, it looks for an instance of VR-Engage that is already running or an instance of VR-Forces that is running. If it finds one, it immediately connects to that session, loads the terrain it is using, and then asks you what character you want to control. If it does not find a session, it stops and ask you what to do.

1. On the Start menu, choose **MAK Technologies** → **VR-Engage**. (If you just have a license for VR-Engage Ground or VR-Engage Air, choose that instead of VR-Engage.)

The VR-Engage window opens. The Searching for Session screen opens (Figure 3-1).

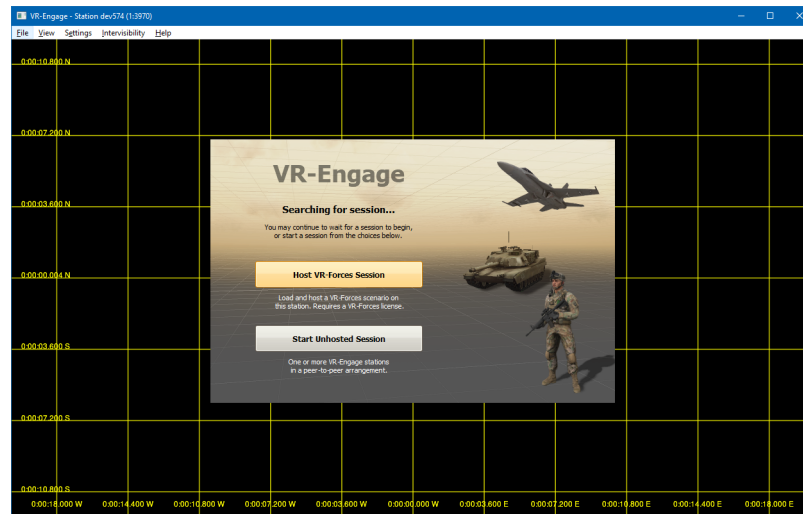


Figure 3-1. Searching for Session

2. Click Host VR-Forces Session. The Host a VR-Forces Session dialog box opens (Figure 3-2).

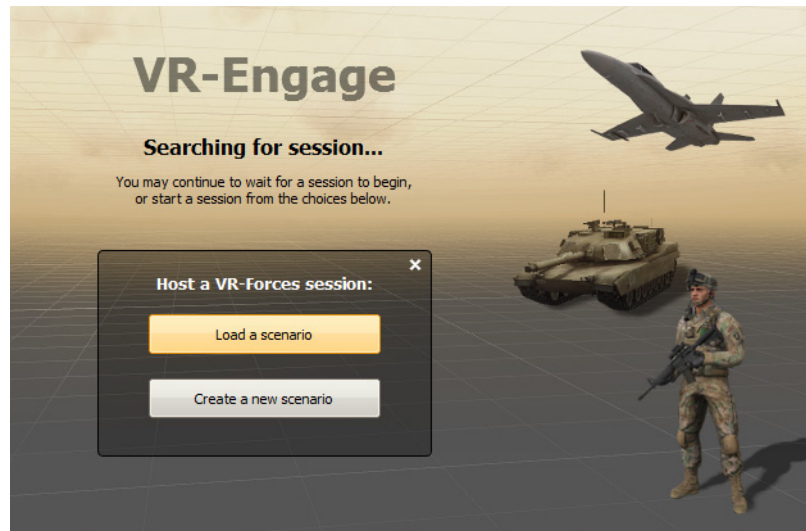


Figure 3-2. Host a VR-Forces session dialog box

3. Click Load a Scenario. The Choose a Scenario for this Session dialog box opens (Figure 3-3).

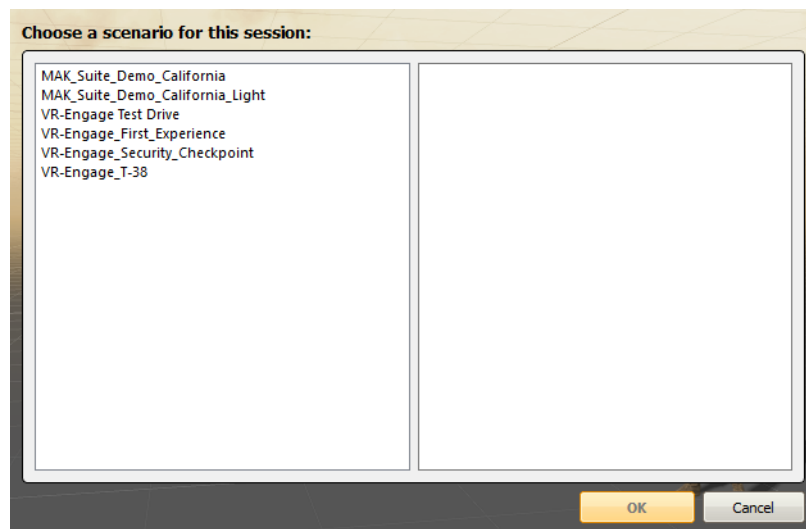


Figure 3-3. Choose a scenario for this session dialog box

4. Select VR-Engage_First_Experience.
5. Click OK. The terrain and scenario load. The Choose Role Panel is displayed (Figure 3-4). It lists the characters that you can create if you want to add a new character to the scenario or it lists the characters that are already in the scenario.

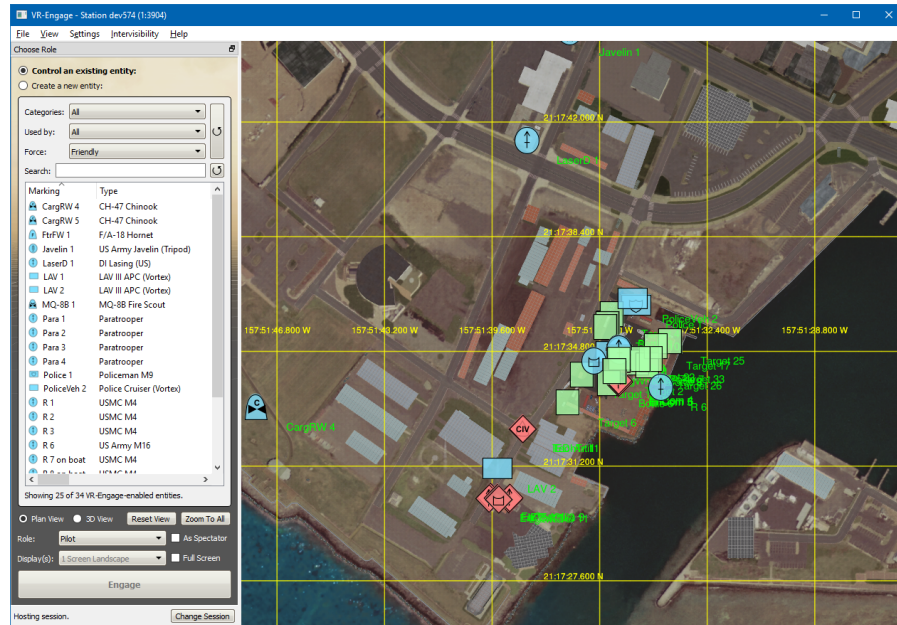


Figure 3-4. Choose Role panel



If you just have a license for VR-Engage Ground, you will get a couple of error messages when the scenario loads telling you that you do not have the licenses for controlling fixed-wing and rotary-wing aircraft. Just click OK. The scenario will run without these licenses.

6. Select the Control an Existing Entity option.
7. In the list of entities, select R1 USMC M4.
8. Click Engage. The display changes to full screen mode and the scenario starts to run.

3.1.1. Walk Around the Warehouse Area

Your character is standing in front of a warehouse with other friendly forces and some vehicles.

1. Use the keyboard, mouse, and Gamepad (if available) to look around and then start walking around. (Please see [Table 6-1](#) for a list of mouse and keyboard mappings and [Figure 6-1](#) for an illustration of Gamepad mappings.)
2. There is a door to the right of the open bays in the warehouse ([Figure 3-5](#)). Walk to the door so that you are within a foot or two of it.



Figure 3-5. Warehouse door

As you get close to the door, the Door menu opens ([Figure 3-6](#)).

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You can choose menu options using your keyboard, mouse, and game controller. Rather than trying to list all the options each time we ask you to choose a menu command, we will introduce different methods throughout this chapter.



Figure 3-6. Door menu

3. Press **1** to choose Open.
4. Walk into the building.
5. Look around the room. There are a couple of targets.
6. Press the Fire button on your Gamepad or the **Space** key to shoot at the targets. (See the next section for lots of target practice.)
7. Walk into other rooms. Walk up the stairs and explore the upstairs rooms.

3.1.2. Shoot At Targets

The default weapon is a rifle.

1. Walk back out to the parking area in front of the warehouse.
2. Look at the top of the shipping containers. You will see some targets.
3. Align the reticle (the white bulls-eye) of your gun on a target and press **Space**, the left mouse button, or the Gamepad trigger to fire it.
4. Walk along the shipping containers, looking at the spaces between them. Watch for some insurgents ([Figure 3-7](#)).



Figure 3-7. Insurgents

5. When you see the insurgents, you can fire at them. (If you walk within approximately 4 meters of the opening between the shipping containers, the insurgents will attack you.)
6. To aim the rifle, hold down the **M** key or the Aim Down Sight button on your Gamepad. Move the sight with the arrow keys or the right mouse thumbstick.



In this scenario, all Friendly forces are invulnerable. So the opposing forces cannot kill you, but you might see a lot of blood being shed if they shoot at you.

3.1.3. The Action Menu

So far, you have encountered a couple of context-sensitive menus that open automatically. The next activity in this first experience asks you to open the Action menu. The Action menu lets you turn several features on and off (toggles) and lets you assign tasks to other players if you are hosting a VR-Forces scenario or connected to a VR-Forces session.

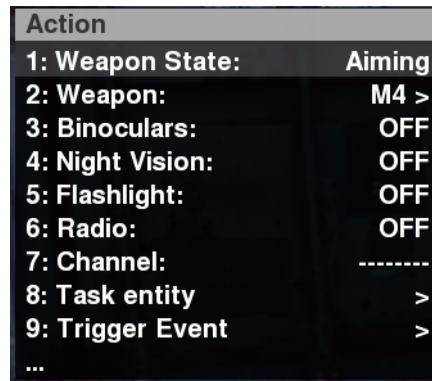


Figure 3-8. Action menu

To open the Action menu, do either of the following:

- ♦ Press ~.
- ♦ Press the menu button on your game controller (the Back button on the Gamepad).

Selecting Options on the Action Menu

You can select options on the Action menu using the keyboard (arrow keys or number keys), the D-pad on a Gamepad, or your mouse.

To select an option on the Action menu using the arrow keys or D-pad:

1. Press the **Up Arrow** and **Down Arrow** keys on your keyboard or the up and down buttons on a Gamepad's D-pad to highlight an option.
 2. Press the **Right Arrow** key or the right button on the D-pad to toggle the option on or off or to display a submenu.
- To select an option on the Action menu using a mouse, click the menu option.

Each option on the Action menu has a number.



Numbers get reassigned dynamically if you scroll the Action menu or menu commands get removed due to some change in the state of the character. Therefore, you cannot assume that a particular number always controls the same command.

- To select an option on the Action menu using a number key, press the number associated with the menu option.

3.1.4. Embark On and Disembark From a Vehicle

Your character can embark on and disembark from vehicles. If the vehicle has available roles, such as the LAV, you can assume one of the roles or embark as a passenger. If the vehicle has interior geometry, such as the 5-ton truck or some helicopters, and you embark as a passenger, you will see the interior of the vehicle and other passengers, if they are present. If the vehicle does not have interior geometry, such as the LAV, and you embark as a passenger, you see the vehicle in third-person view.

Your character can also embark on a VR-Forces entity as a passenger and let the VR-Forces simulation engine handle the driving.

1. Look around the parking area until you see a truck.
2. Walk towards the truck. When you get close to the truck, the Embark in Seat menu opens ([Figure 3-9](#)).



Figure 3-9. Embark menu

3. Press 1 to select Passenger. Your character embarks on the truck. The truck starts to drive.
4. Look around at the scenery as the truck drives.
5. When you are ready to get off the truck, move the mouse to the left and right. If your character moves its head, you are in mouse look mode.
6. Press **CTRL** to exit mouse look.
7. Press the tilde key (~). The Action menu opens. You can now use the mouse to select options on the menu.

8. Scroll the mouse wheel until you see Disembark on the menu.
9. Click Disembark. The character is placed off the back of the truck.
10. Press **CTRL** to return to mouse look mode.



Another way to disembark is to use the Action menu to have your character stand up and then turn the character and walk off the back of the truck.

3.1.5. Give Simulated Entities a Task

You can interact with the other entities in a scenario. In this section, you will throw a grenade, which triggers a fire team insertion. Then you will task an entity to move.

1. If the Action menu is not open, press ~ or the Back button on the Gamepad to open it.
2. Select Weapon.
3. Press the right D-pad button or the right Arrow key. The Weapons submenu opens.
4. Use the up and down Arrow keys or the D-pad buttons to highlight Smoke Grenade ([Figure 3-10](#)).
5. Press the right D-pad button or the right Arrow key to select it. (You can also change the weapon by pressing the Select Weapon button on the Gamepad.) When you select a grenade, a circular target cursor is displayed. The cursor indicates where the grenade will land.



Figure 3-10. Smoke grenade target



If the soldier is aiming towards an area with a light background, the target point may be hard to see. Make the soldier look around until you see the cursor.

6. Face an open area in the warehouse lot.
7. The target cursor is placed wherever you character is looking. Use the right thumbstick on your Gamepad to move the target to a spot on the ground.
8. Press the Fire Weapon button or key to throw the grenade. The grenade will emit a smoke plume. After about a minute, a helicopter will approach and a fire team will drop down using fast roping ([Figure 3-11](#)).



Figure 3-11. Fast roping

9. After the helicopter flies away, open the Action menu.
10. Select Task Entity. A list of entities is displayed.
11. Scroll down the list until you can select Unit 1. (The four soldiers who disembarked from the helicopter are named Unit 1, Unit 2, Unit 3, and Unit 4.)
12. Press the Right Arrow or the right button on the D-pad for a list of tasks.
13. Use the Arrow keys or D-pad to highlight Move to Location. A waypoint symbol is displayed ([Figure 3-12](#)). (Do not press the number for this task or click on it. These actions activate the task and you must specify the location to move to before you activate the task.)

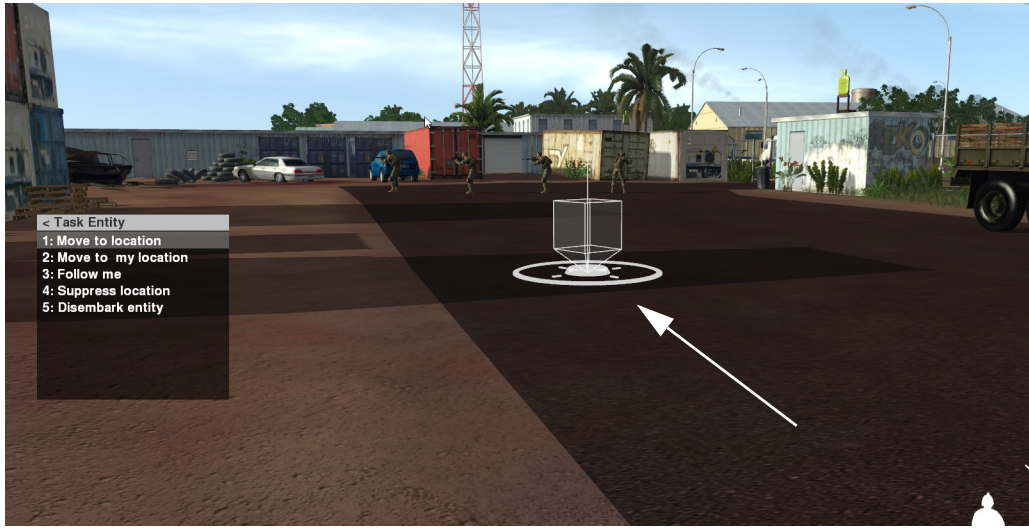


Figure 3-12. Waypoint symbol

14. On the Gamepad, use the right thumbstick to move the waypoint to the location where you want Unit 1 to move.
15. Press the Right Arrow, the right button on the D-pad, or the B button on the Gamepad to activate the menu option. Unit 1 moves to the location.

3.1.6. Change Your Role in the Scenario

You can change the role you are playing to be any entity in the scenario.

To change your role:

1. Press **F5** to move the character back to its starting location.
2. If the weapon is still a grenade, press the weapon button on your Gamepad to select the M4.
3. Turn your character and walk towards the LAV. When you get close to the LAV, the Embark LAV menu opens ([Figure 3-13](#)).



Figure 3-13. Embark LAV menu

4. Select Driver. You are now controlling the driver of the LAV. Use your game controller to drive the LAV.
5. Press the Y button on your Gamepad to switch through different views: a driver's view, a couple of oblique 3rd-person views, and a gunner's view. Note that you can aim and fire the gun, as well as drive.
6. Press the Gamepad Start button to start the motor.
7. Press the Gear Up button to put the LAV into gear.
8. Use the throttle and steering controls to drive towards the exit at the far end of the warehouse area. (It might be easier to navigate through the parking lot using one of the 3rd person views.)
9. Take a left out of the gate onto the road and drive down the road.



While the driver can shoot as well as drive, it is also possible to have another VR-Engage player assume the role of gunner while you are in the role of driver.

3.1.7. Damage Terrain

1. Drive down the road.
2. As you approach the end of the road, you will see a truck parked next to the building by the tower (Figure 3-14). There is an explosive device underneath the truck that when fired upon will detonate and destroy the adjacent building.



Figure 3-14. Undamaged truck

3. Press the Y button on the Gamepad until you see the Gunner view. It has a square frame with a dot in the center (Figure 3-15).



Figure 3-15. Gunner view

4. Fire on the truck using the 25mm cannon on the LAV. The truck and the building will explode and be damaged (Figure 3-16).



Figure 3-16. Damaged truck and building

3.1.8. Physics Model

There is another LAV vehicle on the road opposite the truck you just destroyed.

1. Change the view of your LAV to a 3rd-person view. (Press the Y button on your Gamepad.)
2. Drive into the other LAV and observe how the physics-based vehicle model realistically models the collision.
3. Drive onto the curb or rugged nearby terrain and observe the individual articulation of the wheels.

3.2. Fire a Missile Launcher

VR-Engage supports shoulder-mounted and tripod-mounted Javelin missile launchers. The First Experience scenario has a tripod-mounted launcher. In this section you will learn how to deploy it, fire at a target, and recover the launcher.

1. If VR-Engage is not running, start it and load the VR-Engage First Experience scenario. If it is running, start a new session, as follows:
 - a. Press **ESC** to return to the Choose Role Panel.
 - b. At the bottom of the Choose Role Panel, click Change Session. VR-Engage displays a confirmation prompt.
 - c. Click Yes. VR-Engage returns to the Host VR-Forces Session screen.
 - d. Click Host VR-Forces Session and load the VR-Engage First Experience scenario.

2. In the Choose Role Panel, select Javelin 1.
3. Click Engage. You are now standing on top of a building holding a rifle.
4. Turn slightly to the right to face a tall building (Figure 3-17).



Figure 3-17. Standing on the roof

5. Open the Action menu.
6. Choose **Deployable Objects** → **Deploy Javelin Launcher**. An on-screen message states that the missile launcher is being deployed. When it is deployed you can see the tube at your feet. The Action menu is now titled Javelin Launcher (Figure 3-18).



Figure 3-18. Launcher deployed

7. In the Action menu, choose **Use Launcher**. Your character is hidden. A view finder is displayed in the upper right portion of the screen and an aiming reticle is displayed.
8. Use the right thumbstick on your Gamepad or the mouse to aim the launcher at the building you blew up when you practiced driving the LAV. You can see it in the distance to the left of the tall building you are facing (Figure 3-19).

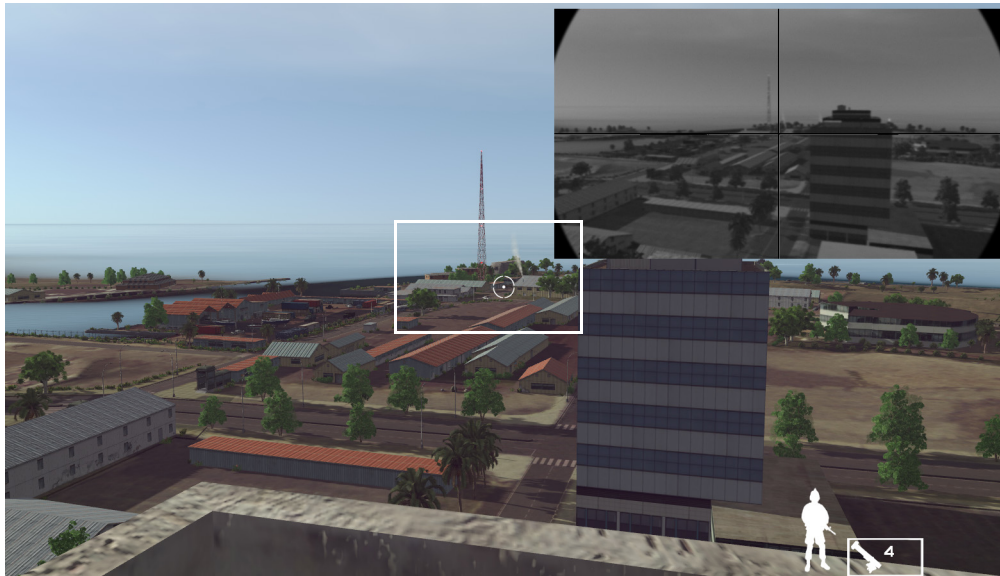


Figure 3-19. Target and view finder

9. Fire the launcher. You will see the missile fly out and the building will explode.
10. Optionally fire some more missiles. You can fire up to four.
11. Open the Action menu.
12. Choose **Exit Launcher**.
13. Back up a few feet so that you can see the launcher and then walk towards the launcher until the Action menu opens.
14. Choose **Recover Launcher**. The launcher is no longer displayed. You are now back to first-person view of your character.

3.3. Parachute Out of a Helicopter

Paratroopers can jump from aircraft and deploy parachutes. They can steer left and right and can slow their descent. Parachutes are affected by wind.

When a paratrooper jumps, the view changes to a third-person view and the weapon is hidden. When the paratrooper lands, it returns to the view mode used prior to jumping and the weapon is available.

1. If VR-Engage is not running, start it and load the VR-Engage First Experience scenario. If it is running, start a new session, as follows:
 - a. Press **ESC** to return to the Choose Role Panel.
 - b. At the bottom of the Choose Role Panel, click Change Session. VR-Engage displays a confirmation prompt.
 - c. Click Yes. VR-Engage returns to the Host VR-Forces Session screen.
 - d. Click Host VR-Forces Session and load the VR-Engage First Experience scenario.
2. In the Choose Role list, select Paratrooper 1 (Para1).
3. Click Engage. You are now seated in a helicopter. You can see other paratroopers seated across the aisle ([Figure 3-20](#)).



Figure 3-20. Seated in the helicopter

4. On the Action menu, select Stand Up.
5. Turn towards the rear of the helicopter ([Figure 3-21](#)).



Figure 3-21. Cargo door closed

6. On the Action menu, select Open Cargo Door. The cargo door opens ([Figure 3-22](#)).



Figure 3-22. Cargo door opened

7. (Hint: Read steps 8 through 10 before you complete step 7 so that you know how to deploy your parachute and control it before you jump out of the helicopter.) Walk to the cargo door as far as you can. When you step off, the view changes to third person and you are falling towards the earth. The overlay shows the wind speed and direction and your altitude ([Figure 3-23](#)).



Figure 3-23. Free fall

8. After your character falls for a few hundred feet, press **Spacebar** or the left thumbstick on your Gamepad to deploy the parachute (Figure 3-24). (If you do not deploy the parachute, or wait too long to do so, the paratrooper will die on impact.)



Figure 3-24. Parachute deployed

9. As you descend towards the ground, press the **A** and **D** keys or buttons 5 and 6 on your Gamepad to move left or right. (For a diagram of Gamepad buttons, please see “[Generic Gamepad Button Numbering](#),” on page 6-30.)

10. Press **A** and **D** or buttons 5 and 6 together to slow the rate of descent.
11. Move the right thumbstick on the Gamepad, the Up and Down arrows on your keyboard, or the move the mouse forward and back to look up and down. Notice that other paratroopers have jumped out of the helicopter (Figure 3-25). They will try to follow you to your landing point.



Figure 3-25. Looking up

12. When you land, you return to first-person view. You do not need to gather the parachute.

3.4. Fly a Fighter Jet

So far we have looked at controlling humans and ground vehicles. Now let's try to fly an F/A-18. VR-Engage includes mappings for the Thrustmaster Warthog flight controller, the T.Flight Hotas X flight controller, and the Gamepad F310. Please see "[Flight Controllers](#)," on page 6-11 for mappings.

If you have not used a game controller to fly a simulated jet before, we recommend that you practice a bit first with the VR-Engage Test Drive scenario. For details, please see "[Test Drive a Fighter Jet](#)," on page 2-17.

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The Gamepad provides limited flight support. It is recommended that you use a game controller with a joystick and throttle, such as the supported Thrustmaster controllers.

1. If VR-Engage is not running, start it and load the VR-Engage First_Experience scenario as you did earlier in this first experience.
2. Choose **Settings** → **Tactical Graphics**. This scenario has tactical graphics that we want you to see. Tactical graphics are disabled by default, so you need to turn them on.
3. Use the mouse wheel to zoom out so that you can see more of the island and aircraft located south of it.

Take a look at the layout of entities in the scenario ([Figure 3-26](#)). You will see a blue force jet in the center of Oahu. You will also see some large areas drawn on the map. The scenario has three vignettes for you to play:

- A dismounted infantryman is lasing a target in the Ala Moana area of Honolulu. As you fly towards the coast you will see the laser code and can bomb the target.
- When the jet flies into the yellow area, a SAM battery will fire surface-to-air missiles at you. Your job is to evade the missiles.
- When the jet flies into the green area, several Mig-29s will approach you. Your job is engage them in combat.

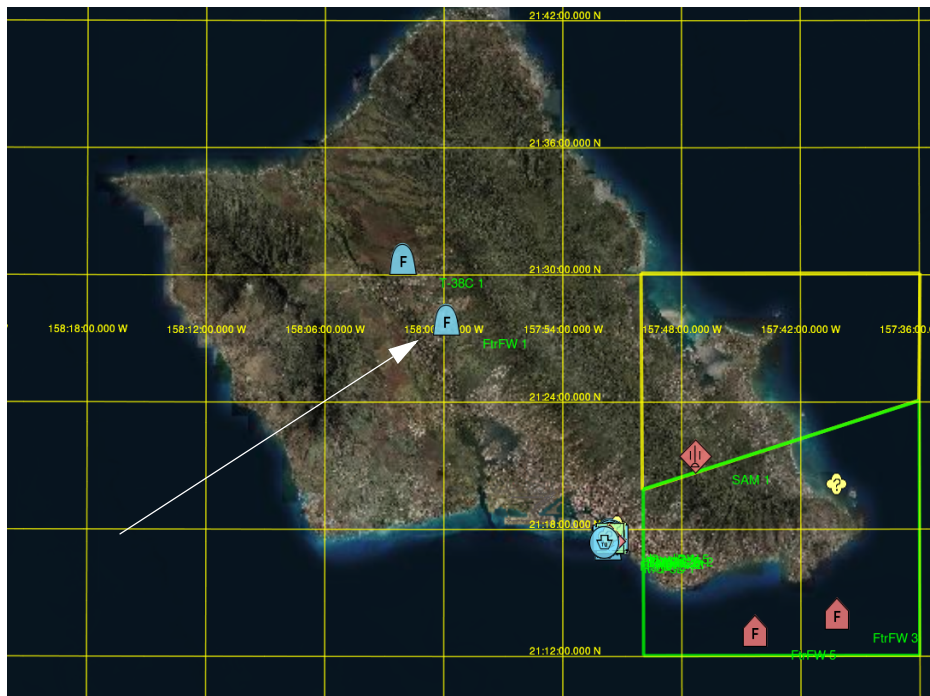


Figure 3-26. Jet experience areas

3.4.1. Take Control of the Jet

To take control of the jet:

1. In the Choose Role Panel or on the map, select FtrFW 1.
2. If you are using two monitors, in the Display(s) list, select 2 Screens. If you are using one monitor, select 1 Screen Horizontal or 1 Screen Vertical, depending on the orientation of your monitor.
3. Click Engage. The screen changes to show a HUD and an instrument panel. (If you just have one monitor and choose 2 Screen, the HUD will probably obscure the instrument panel. Press **ALT+TAB** to display the instrument panel.)



When you engage an entity that is flying, keep an eye on your speed and altitude to ensure that you do not crash.



Figure 3-27. HUD and instrument panel (1 Screen Landscape display)

3.4.2. The Head-Up Display

The head-up display (HUD) provides an out-the-window view with an overlay showing speed, altitude (R = above ground level; A = above mean sea level), and heading (Figure 3-28).



Figure 3-28. HUD (2 Screen display)

3.4.3. The Instrument Panel

The instrument panel (Figure 3-29) has six gauges and four multi-function displays (MFD).



In a two screen display, the instrument panel is an independent window. You can minimize and maximize it. Sometimes it gets hidden behind the HUD. If that happens, press **ALT+TAB** to bring it to the front.

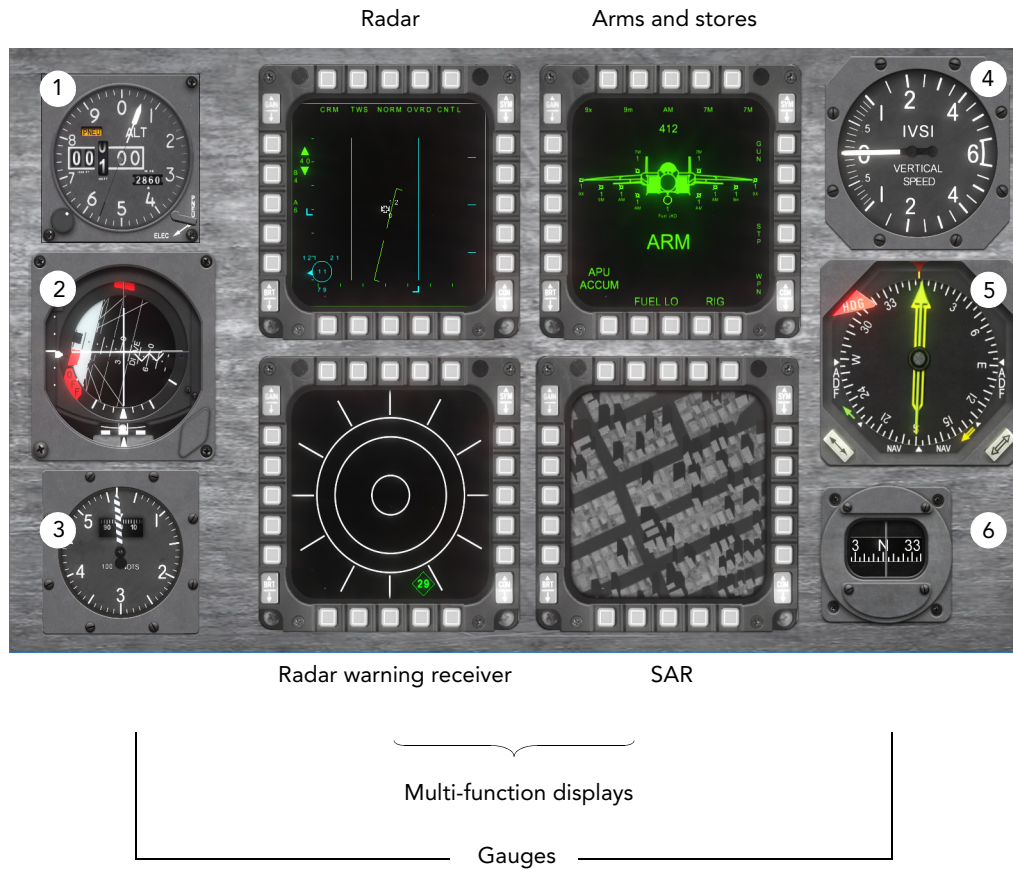


Figure 3-29. Instrument panel (2 Screen display)

The gauges are:

- ♦ 1 – Altimeter.
- ♦ 2 – Attitude Indicator (Artificial Horizon).
- ♦ 3 – Airspeed Indicator.
- ♦ 4 – Vertical Speed Indicator.
- ♦ 5 – Heading Indicator.
- ♦ 6 – Compass.

The MFDs are:

- ♦ Tactical Situation Display (Radar Indicator).
- ♦ Weapons/Stores Control Panel.
- ♦ Synthetic Aperture Radar (SAR) view.
- ♦ Radar Warning Receiver. Shows entities that are detecting you on their radar. The rings show the effective threat range.
- ♦ Visual Sensor Display. Displays the view from the gimbaled sensor or a plan view display of the scenario.

Changing the Multi-Function Display

Each MFD window can display any of the possible display types.



Figure 3-30. Multi-function display

- To change the display, click one of the buttons along the bottom of the display. For Arms and Stores and Sensor view/Plan view, clicking one of the two leftmost buttons on the top of the MRD changes the display.

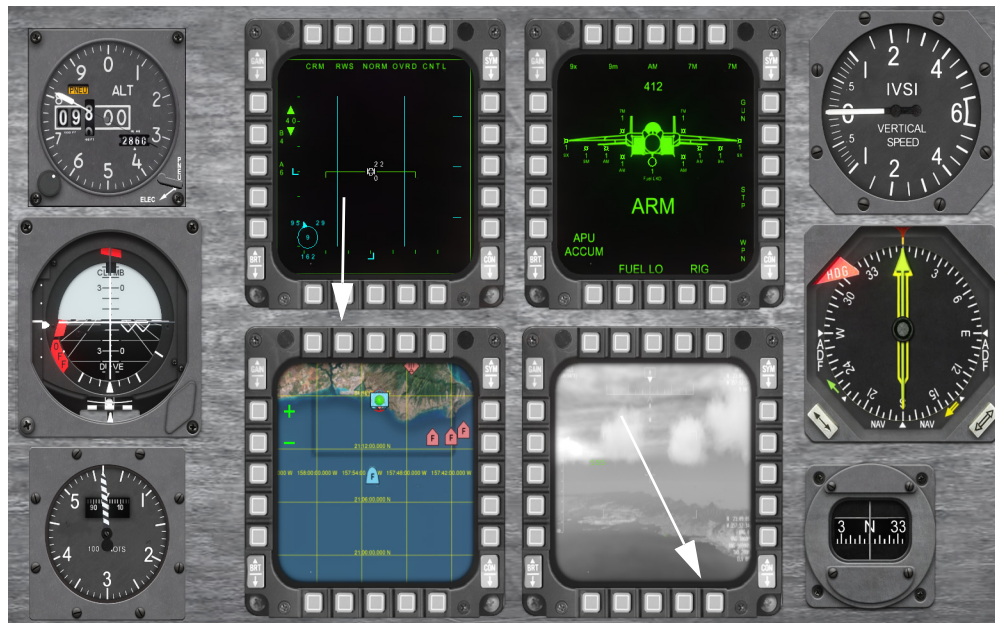


If the MFD display does not change when you click the buttons, the instrument panel might not have focus. Maximize it to ensure that it has focus.

3.4.4. Set Up The Multi-function Displays

Start by changing the MFDs to a more useful set.

1. Click the right-most button under the SAR display to change it to the sensor view display, as illustrated in [Figure 3-31](#).
2. Click the second button from the left above the sensor view display to change it to plan view display. Now you have a ground-truth view of the entities in the scenario. This will help you understand where you are in relationship to the other entities.



Plan view

Sensor view

Figure 3-31. Multifunction displays

3.4.5. Bomb a Target

Bombs get dropped wherever the target pod is looking. There are two ways to identify the target – you can specify MGRS coordinates, or you can lase the target and look at the location being lased. For lased targets, you can look at the target once, or you can continuously track what the laser is targeting. We will use this last type.

In this scenario an entity is lasing a target. If VR-Forces is controlling the lasing entity, the laser code is 555. If another player is controlling the lasing entity, the laser code is 1234.

To bomb the target:

1. After you take control of the jet, start flying towards the southern coast of the island.
2. Look at the HUD. You should see a laser code ([Figure 3-32](#)). (The text is light green, so it may be hard to see.)



Figure 3-32. Laser code

3. Open the Action menu.
4. Choose **Gimbaled Sensor** → **Set Laser Code**.
5. Type 555. The sensor view focuses on the lased object ([Figure 3-33](#)).

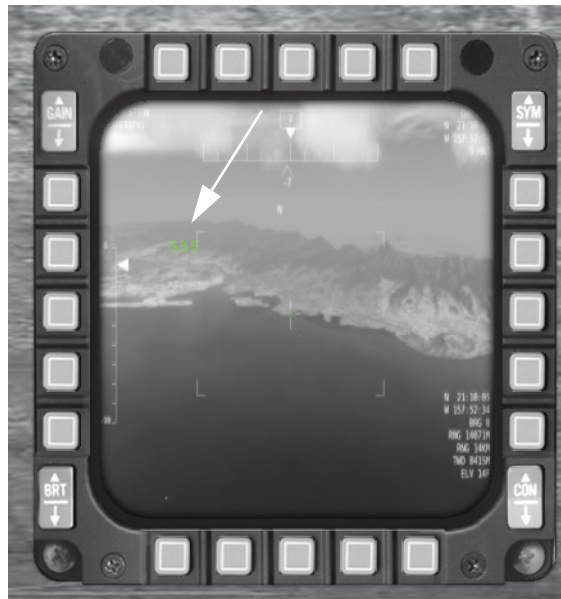


Figure 3-33. Sensor view

6. Press ENTER.
7. Fly as close to the target as you want.
8. Press the trigger to drop the bomb.

3.4.6. Air-to-Air Combat

If you survive the missile attack, fly the jet to the Southeast area of Oahu - the green area you saw when you chose your role. When you enter the area, red force fighters will approach you. You can view them on your plan view display and the Radar Indicator (Figure 3-34). You also may be able to see them visually in the HUD.

A blue cursor along the bottom of the Radar Indicator shows when the radar is scanning. Yellow icons indicate detected targets.

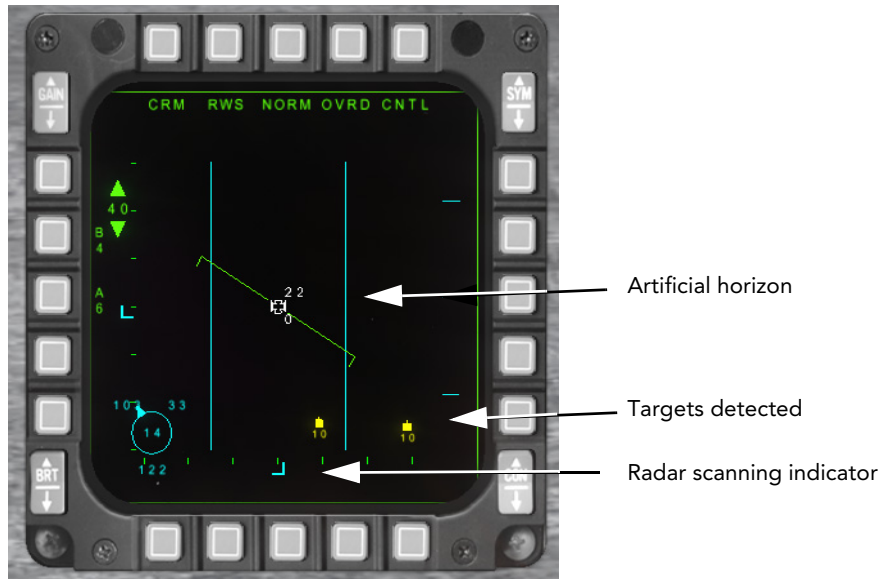


Figure 3-34. Radar Indicator

You may also see targets as green diamonds on the HUD (Figure 3-35).



Figure 3-35. Targets in HUD

Select the target using the cursor select controls. Once you have locked on a target (Figure 3-36), you can fire a missile at it. The F/A-18 has two air-to-air missiles. You can tell you have locked on a target when the following things happen in the Radar Indicator:

- ♦ The target icon becomes an outline instead of being solid.
- ♦ The radar scanning indicator tracks the target instead of sweeping back and forth.
- ♦ The gates (the two vertical lines in the Radar Indicator) are no longer displayed.

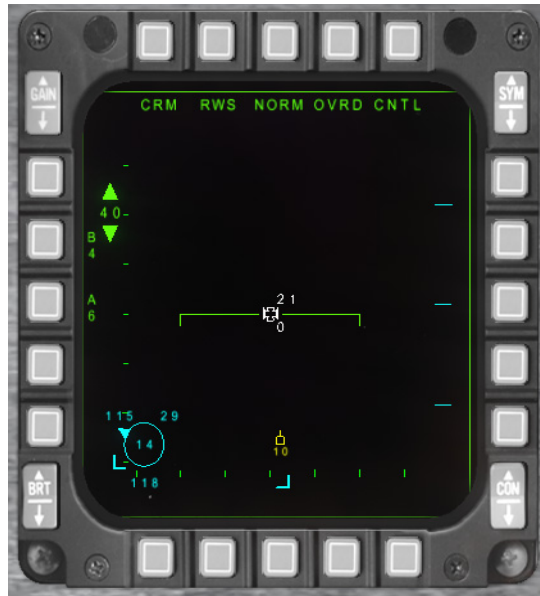


Figure 3-36. Radar lock



4. Controlling VR-Forces Entities

This chapter explains how you can control characters being simulated by a VR-Forces scenario.

[Taking Control of VR-Forces Characters](#) 4-2

4.1. Taking Control of VR-Forces Characters

In the previous chapters, you have been running a scenario created in VR-Forces and provided with VR-Engage. You have been running it by hosting a VR-Forces session, which means that you have started a VR-Forces simulation engine, loaded the scenario in the simulation engine and connected to it through VR-Engage. VR-Engage users can also connect to and interact with VR-Forces sessions running on the network. In fact, this integration with VR-Forces is a significant aspect of the versatility and usefulness of VR-Engage.

When VR-Engage finds a VR-Forces session running on the network, it automatically connects to it. If that instance of VR-Forces has installed the VR-Engage add-ons, VR-Engage can take control of human characters being simulated by VR-Forces and vehicles that have been configured to be controlled by VR-Engage (the LAV, M1A2, and certain aircraft). Just as importantly, if VR-Engage gives up control of a character, that character resumes executing whatever task or plan it was executing before VR-Engage took control of it. Let's try this out.

To try out this part of the first experience, you must install VR-Forces on a computer on your network and you must install the VR-Engage add-ons for VR-Forces. For details, please see [“Installing a Compatible VR-Forces and VR-Engage Add-ons,”](#) on page A-3. When you have the add-ons installed, you can start.

1. Start VR-Forces.
2. On the VR-Forces Launcher, select the DIS (7) connection.
3. Click Launch. VR-Forces starts up and the Scenario Startup dialog box opens.
4. Select Load Scenario From Disk.
5. Click OK.
6. In the Load Scenario dialog box, select VR-Engage_First_Experience.
7. Click Open.
8. Select *VR-Engage_First_Experience.scn*.
9. Click Open. The scenario loads.



The VR-Engage_First_Experience scenario is configured to use two VR-Forces simulation engines (back-ends) to improve performance. If you do not have two simulation engines running, VR-Forces prompts you to remap the simulation objects using one simulation engine. Click OK and continue with the scenario load process.

10. Press **e** or use the scroll wheel on your mouse to zoom in on the warehouse area in Ala Moana. It should look just like the scenario did when you first tried out VR-Engage ([Figure 3-4](#)).

11. Choose **Simulation** → **Run Scenario**. Notice that entity R 6 starts patrolling between Waypoint 6 and Waypoint 7.

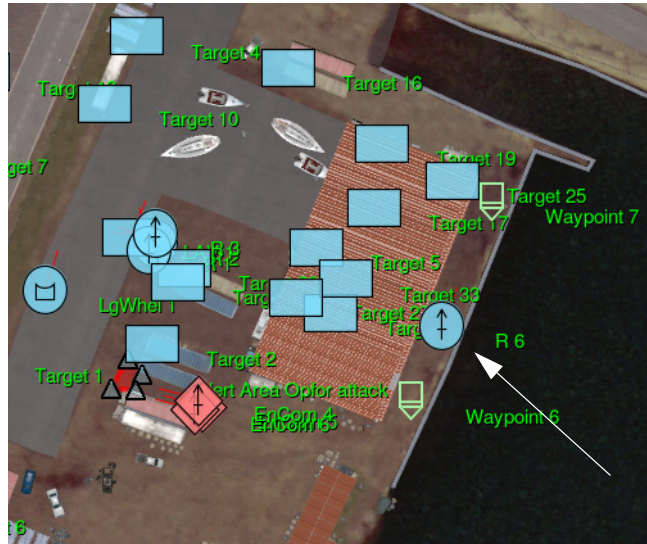


Figure 4-1. R 6 patrolling

12. Start VR-Engage. It automatically detects the VR-Forces session, loads that terrain, and presents the Choose Role panel. You can see R 6 patrolling in the Plan View display.
13. Select R 6.
14. Click Engage. You now control R 6 and he stops patrolling.
15. Walk around the end of the warehouse and out towards the open area with the boats and other entities. Prove to yourself that you now control R 6 as the entity in the VR-Forces screen performs your movements in VR-Engage.
16. Press **ESC**. VR-Engage returns to the Choose Role panel and you give up control of R 6. Watch the VR-Forces screen as R 6 walks back to the area along the water and begins patrolling between Waypoint 6 and Waypoint 7 again.



5. The Security Checkpoint Scenario

The Security Checkpoint scenario is an example of how you can use VR-Engage to set up a focused training environment.

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5.1. Introduction to the Security Checkpoint Scenario

The Security Checkpoint scenario has a security checkpoint (Figure 5-1) consisting of:

- ♦ A security booth.
- ♦ Two gates with articulated arms.
- ♦ Gimbaled cameras mounted on poles.
- ♦ Traffic lights.



Figure 5-1. Security checkpoint

The checkpoint is manned by guards. If you engage the scenario as a guard, when you enter the gatehouse, you can open a security panel. The panel lets you move the cameras and raise and lower the gates. The traffic lights are dynamic. When a gate is raised, the light is green. When it is lowered, the light is red.

The scenario uses the VR-Forces pattern of life feature to generate traffic. When a gate is down, cars that approach the gate come to a stop. If the gate is up, they drive through the checkpoint.

5.1.1. Load the Security Checkpoint Scenario

To load the Security Checkpoint Scenario

1. If VR-Engage is not running, start it. If it is running, in the Choose Role Panel, click Change Session.
2. Click Host VR-Forces Session. The Host a VR-Forces Session dialog box opens.
3. Click Load a Scenario. The Choose a Scenario for this Session dialog box opens.
4. Select VR-Engage_Security_Checkpoint.

5. Click OK. The terrain and scenario load. The Choose Role Panel is displayed.
6. Select Guard 1.
7. Click Engage. You are inside the guard house and the Security Station menu is open.

5.1.2. Opening the Security Panel

If you are playing the role of a security guard, you can open the security panel and manipulate its controls.

To open the security panel:

1. On the Action menu, select Open Security Panel. The security panel opens (Figure 5-2).

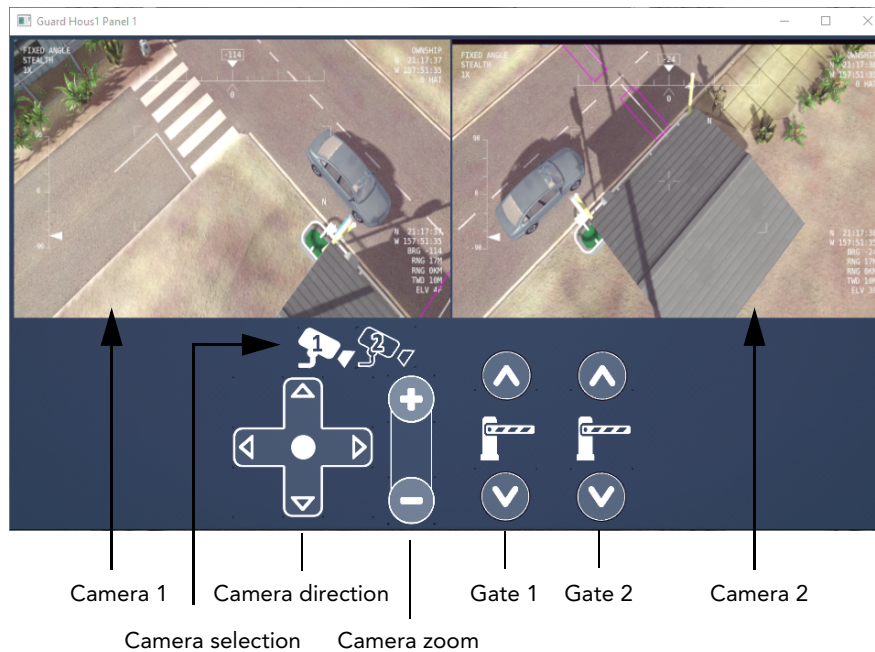


Figure 5-2. Security panel



The security panel may open behind the main VR-Engage window. To see it, press **ALT+TAB** to select it or press **CTRL+ENTER** to change to windowed mode and select the window. You can also simply drag the security panel to a different monitor or location in the window.

5.1.3. Using the Security Panel

You control the security panel with your mouse. You can do the following things (Figure 5-2):

- ♦ Move the security cameras.
- ♦ Zoom the camera view.
- ♦ Raise and lower the gates.
- To move a camera, select the icon for the camera you want to control. Then click the directional arrows.
- To zoom a camera in or out, click the zoom controls.
- To raise or lower a gate, click the Up or Down arrow.
- To close the security panel, click the Close button (X) on the title bar.

5.2. Adding Security Checkpoints to a VR-Forces Scenario

The security booth and gates are created in VR-Forces as a simulation object group. The VR-Engage Add-ons for VR-Forces installs the following four versions of the security checkpoint that you can use to build your own scenarios:

- ♦ Security booth and one gate for driving on the right side of the road.
- ♦ Security booth and one gate for driving on the left side of the road.
- ♦ Security booth and two gates for driving on the right side of the road.
- ♦ Security booth and two gates for driving on the left side of the road.



6. Mouse, Keypad, and Controller Mappings

This chapter describes mouse and keyboard mappings and controller mappings for VR-Engage. You can use other controllers. To do so, you must create a configuration for each controller. For details, please see Section 9.10, “[Configuring Joysticks and Keyboard Control](#),” in *VR-Engage Users Guide*.

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6.1. Mouse and Keyboard Mappings

Table 6-1 lists mouse and keyboard mappings for human players.

Table 6-1: Human player mouse and keyboard controls

Mouse Mappings	
Turn and move weapon	Mouse move
Fire	Left mouse button
Zoom in	Mouse wheel forward
Zoom out	Mouse wheel backward
Aim	Right mouse button
Keyboard Mappings	
Application Management	
Reset in current position (the scenario continues to run)	CTRL + F5
Reset to starting position (the scenario continues to run)	F5
Toggle Action menu	~ (tilde)
Toggle full screen	CTRL + ENTER
Enable/disable mouse control	CTRL
Stop playing	ESC
Movement	
Run forward	SHIFT + W
Walk forward	W
Walk slowly	ALT + W
Walk backward	S
Turn left	Left arrow
Turn right	Right arrow
Posture up	Q
Posture down	E
Toggle First-person/3rd person mode	V
Parachuting	
Deploy parachute	Spacebar
Turn left or right	A, D
Slow rate of descent	A + D

Table 6-1: Human player mouse and keyboard controls

Engagement	
Aim	M
Fire	Spacebar
Strafe left	A
Strafe right	D
Pitch weapon up	Up arrow
Pitch weapon down	Down arrow
Toggle Weapon State (Stowed, Ready, Aiming)	G
View and Accessories	
Toggle night vision goggles	N
Binoculars	B
Talk on the radio	T
Zoom in	=
Zoom out	- (dash)
Toggle flashlight	F

[Table 6-2](#) lists keyboard controls for the LAV in driver mode.

Table 6-2: Keyboard mappings for LAV driver

Function	Key
Steer left	A
Steer right	D
Throttle	W
Brake	S
Gear up	Q
Gear down	E
Start/stop engine	X
Differential lock	C
Turret left	J
Turret right	L
Turret up	I
Turret down	K
Fire	F
Headlights	H

Table 6-2: Keyboard mappings for LAV driver

Function	Key
Parking brake	P
Next weapon	R
Previous weapon	V

Table 6-3 lists the keyboard mappings for aircraft.

Table 6-3: Keyboard mappings for fixed-wing aircraft

Function	Key
Target pod track	1
Synchronize laser code	2
Synchronize laser code continuous	3
Toggle radar warning receiver	M
Launch chaff	C
Launch flares	F
Observer mode	V
Landing gear	G

Table 6-4 lists keyboard controls for the Action menu.

Table 6-4: Action menu mouse and keyboard mappings

Mouse Mappings	
Select menu item	Mouse click
Keyboard Mappings	
Next menu item	Up arrow
Previous menu item	Down arrow
Select menu item	Right arrow or Enter
Return to previous menu	Left arrow

6.2. Gamepad Mappings for Human Control

Figure 6-1 illustrates Gamepad mappings for controlling humans.

i

The Mode button switches the functions of the D-pad and the left thumbstick. Since it is easy to inadvertently press it, if the D-pad and thumbstick are not working as expected, check the Mode button. It should be off (no green light).

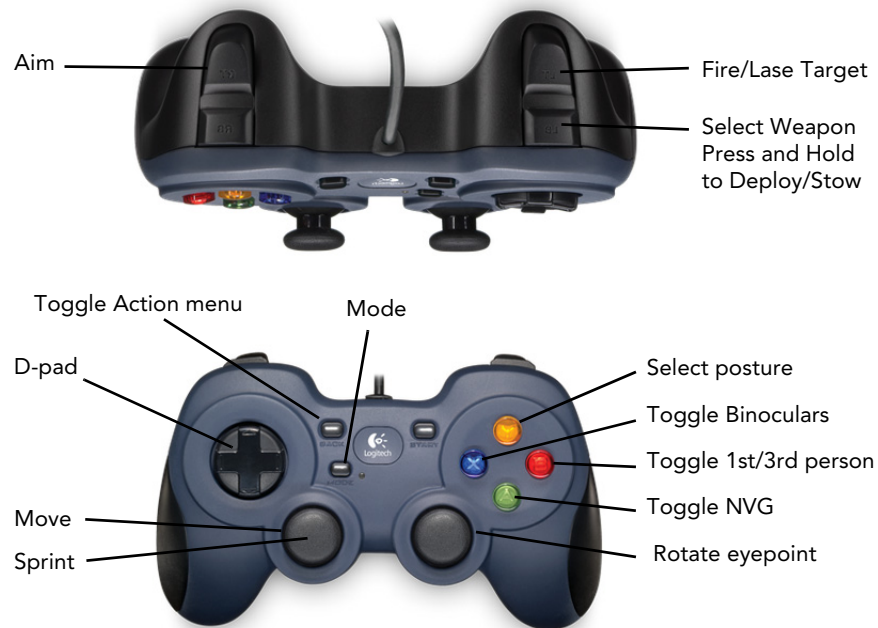


Figure 6-1. Human controls

6.3. Gamepad Mappings for Using the Action Menu

Figure 6-2 illustrates Gamepad mappings for the Action menu.



Figure 6-2. Gamepad menu controls

6.4. Gamepad Mappings for the LAV and M1A2

Gamepad mappings for controlling the LAV and M1A2 depend on the role you are playing. They are illustrated as follows:

- ♦ [Figure 6-3](#) illustrates driver controls. These controls also apply to driving the M1A2 Abrams tank, except as noted.
- ♦ [Figure 6-4](#) illustrates commander controls.
- ♦ [Figure 6-5](#) illustrates gunner controls. These controls also apply to driving the M1A2 Abrams tank.



Figure 6-3. Driver controls for LAV and M1A2



Figure 6-4. LAV commander controls



Figure 6-5. Gunner controls for LAV and M1A2

6.5. Racing Wheel Controllers

VR-Engage supports the Logitech G27 and G29 racing wheel controllers.

[Figure 6-6](#) illustrates the mappings of the G27 racing wheel.



If your racing wheel is not working as expected, make sure you are using the latest drivers.



Figure 6-6. G27 racing wheel controls

[Figure 6-7](#) illustrates the mappings of the G29 racing wheel.

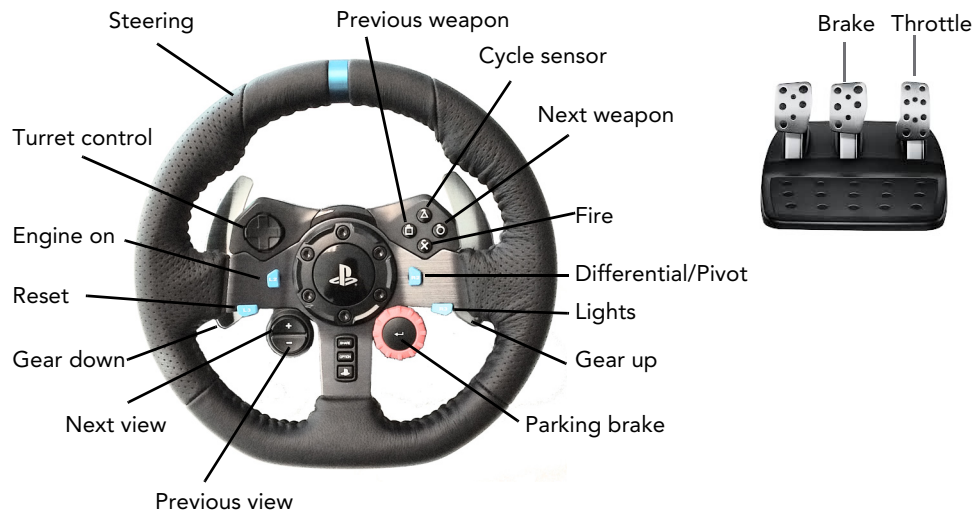


Figure 6-7. G29 racing wheel controls

6.6. Flight Controllers

VR-Engage includes mappings for the Thrustmaster HOTAS Warthog flight (Joystick- HOTAS Warthog) controller, the T.Flight Hotas X (T.Flight Hotas X) flight controller, and the Gamepad F310 and F710 (Logitech Dual Action).

6.6.1. HOTAS Warthog Mappings for Fixed-Wing Entities

Figure 6-8 and Figure 6-9 show the mappings for the Thrustmaster Warthog flight controller for fixed-wing entities.



Figure 6-8. Thrustmaster HOTAS Warthog joystick mappings - fixed-wing

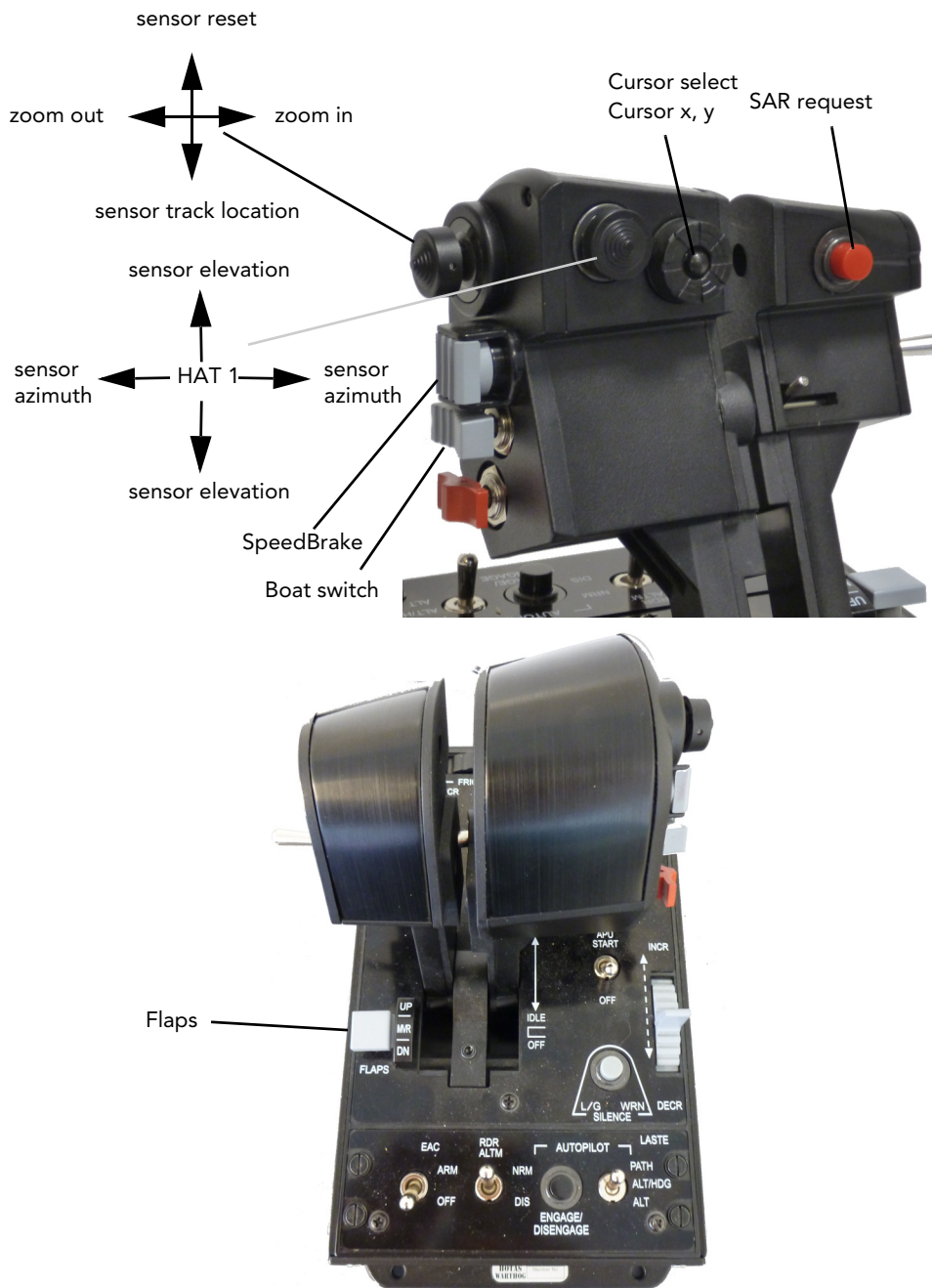


Figure 6-9. Thrustmaster HOTAS Warthog throttle mappings - fixed-wing

Table 6-5 lists the flight controls for the Thrustmaster HOTAS Warthog controller for fixed-wing entities.

Table 6-5: Thrustmaster HOTAS Warthog mappings - fixed-wing

Function	Key/Button
Extended Flight Controls	
AutopilotMode1	Throttle Button 27 Down
AutopilotMode2	Throttle Button 28 Down
AutopilotToggle	Throttle Button 26 Down
Flap 1	Throttle Button 22 Down. Toggle states match joystick up, maneuver, down.
Flap 2	Throttle Button 23 Down. Toggle states match joystick up, maneuver, down.
NoseWheelSteering	Button 3 Down Toggle
ToggleLandingGear	G Toggle
Fire Missile	
fire	Button 1
FixedWingLib CGF Flight Controls	
air-brake	Boat Switch (Button 10) Down. This causes excess drag and the plane's speed drops quickly.
pitch	Joystick forward and back (Axis 2)
roll	Joystick left and right (Axis 1)
throttle	Throttle lever (Axis 3)
wheel-brake	SpeedBrake (Button 7) Down, button 8 Down. If you pull back and release, it recenters. If you push forward, it locks in place. Both directions activate full brakes.
Gimbaled Sensor	
sensor-azimuth	Throttle HAT 1 Right (Up), HAT 1 Left (Down)
sensor-elevation	Throttle HAT 1 Up (Up), HAT 1 Down (Down)
sensor-reset	Throttle Button 3 Down
sensor-track-location	Throttle Button 5 Down
sensor-zoom	Throttle Button 4 (Down), Button 6 (Up)
Observer Control	
ObserverAttachMode	V

Table 6-5: Thrustmaster HOTAS Warthog mappings - fixed-wing

Function	Key/Button
Radar Scope	
cursor-select	Button 1
cursor-x	Axis 1
cursor-y	Axis 2
Release Bomb	
release	Button 2
SAR	
request	Throttle Button 15

6.6.2. HOTAS Warthog Mappings for Rotary-Wing Entities

Figure 6-10 and Figure 6-11 show the mappings for the Thrustmaster Warthog flight controller for rotary-wing entities.

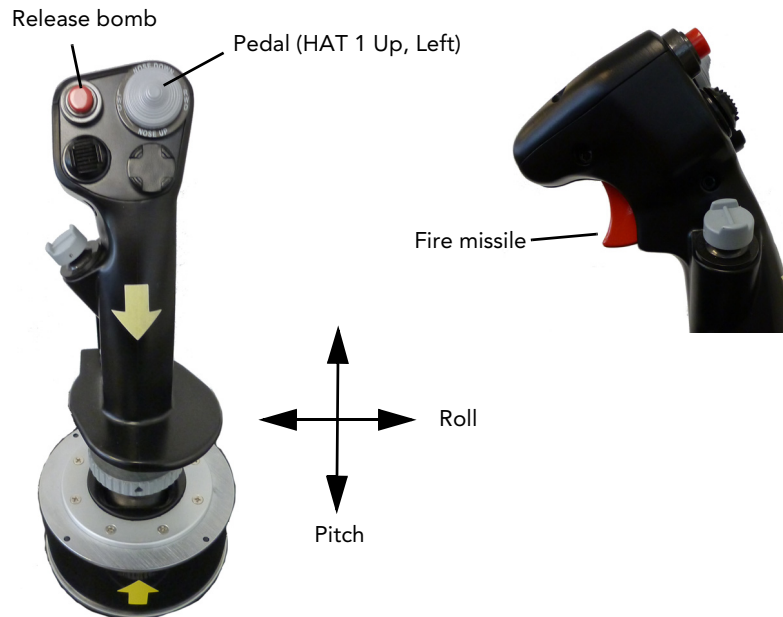


Figure 6-10. Thrustmaster HOTAS Warthog joystick mappings - rotary-wing

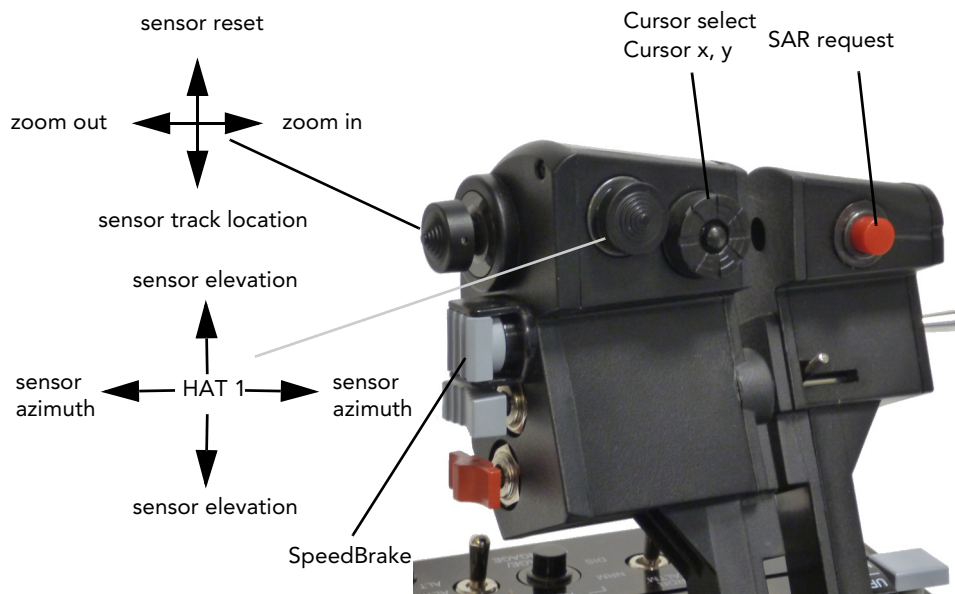


Figure 6-11. Thrustmaster HOTAS Warthog throttle mappings - rotary-wing

[Table 6-6](#) lists the flight controls for the Thrustmaster HOTAS Warthog controller for rotary-wing entities.

Table 6-6: Thrustmaster HOTAS Warthog mappings - rotary-wing

Function	Key/Button
Fire Missile	
fire	Button 1 Down
Gimbaled Sensor	
sensor-azimuth	Throttle HAT 1 Right (Up), HAT 1 Left (Down)
sensor-elevation	Throttle HAT 1 Up (Up), HAT 1 Down (Down)
sensor-reset	Throttle Button 3 Down
sensor-track-location	Throttle Button 5 Down
sensor-zoom	Throttle Button 4 (Down), Button 6 (Up)
Radar Scope	
cursor-select	Button 1
cursor-x	Axis 1
cursor-y	Axis 2
Release Bomb	
release	Button 2
RotorLib CGF Rotary Wing Controls	
collective	Axis 3, <UP>, <DOWN>
pedal	HAT 1 Up, HAT 1 Left
pitch	Axis 2, W
roll	Axis 1, D (Up), A (Down)
wheel-brake	SpeedBrake (Button 7) Down, button 8 Down. If you pull back and release, it recenters. If you push forward, it locks in place. Both directions activate full brakes.
SAR	
request	Button 15

6.6.3. T.Flight Hotas X Mappings for Fixed-Wing Entities

Figure 6-12 shows the joystick controls for the T.Flight Hotas X flight controller for fixed-wing entities.

VR-Engage also supports the T.Flight Hotas 4 controller. The button layout is similar to the T.Flight Hotas X.



Figure 6-12. Fixed-wing T.Flight Hotas X joystick - fixed wing

Figure 6-13 shows the throttle controls for the T.Flight Hotas X flight controller for fixed-wing entities.

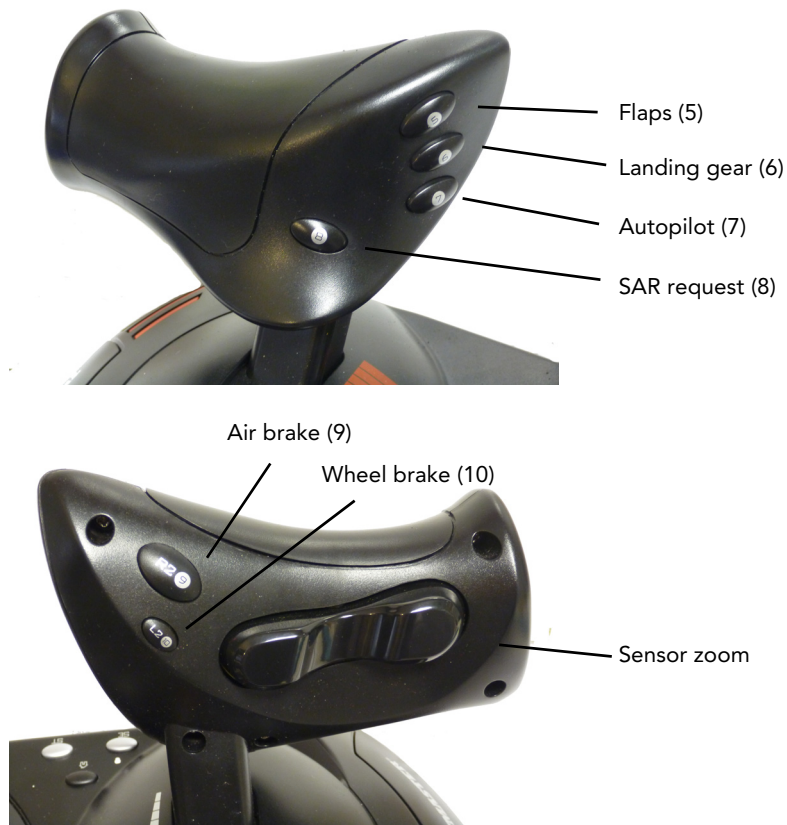


Figure 6-13. Fixed-wing T.Flight Hotas X throttle - fixed-wing

[Table 6-7](#) lists the flight controls for the T.Flight Hotas X controller for fixed-wing entities.

Table 6-7: T.Flight Hotas X mappings - fixed-wing

Function	Key/Button
Fire Missile	
fire	Button 2 Down
cursor select target	Button 3
FixedWingLib CGF Flight Controls	
pedal	Joystick twist left and right (Axis 4)
pitch	Joystick forward and back (Axis 2)
roll	Joystick left and right (Axis 1)
throttle	Throttle forward and back (Axis 3)
autopilot	Button 7
air brake	Button 9 Down

Table 6-7: T.Flight Hotas X mappings - fixed-wing

Function	Key/Button
landing gear	Button 6
flaps	Button 5
wheel-brake	Button 10 Down
Menu	
Action menu	Button 4 Down
down	HAT 1 Down, <DOWN>
left	HAT 1 Left, <LEFT>
right	HAT 1 Right, <RIGHT>
up	HAT 1 Up, <UP>
Observer Control	
Attach mode	V
Radar Scope	
down	HAT 1 Down, <DOWN>
left	HAT 1 Left, <LEFT>
right	HAT 1 Right, <RIGHT>
up	HAT 1 Up, <UP>
Release Bomb	
release	Button 1 Down
SAR	
request	S, Button 8 Down

6.6.4. T.Flight Hotas X Mappings for Rotary-Wing Entities

Figure 6-14 shows the joystick controls for the T.Flight Hotas X flight controller for rotary-wing entities.

VR-Engage also supports the T.Flight Hotas 4 controller. The button layout is similar to the T.Flight Hotas X.



Figure 6-14. Fixed-wing T.Flight Hotas X joystick - rotary-wing

Figure 6-15 shows the throttle controls for the T.Flight Hotas X flight controller for rotary-wing entities.



Figure 6-15. Fixed-wing T.Flight Hotas X throttle - rotary-wing

[Table 6-8](#) lists the flight controls for the T.Flight Hotas X controller for rotary-wing entities.

Table 6-8: T.Flight Hotas X mappings - rotary-wing

Function	Key/Button
Fire Missile	
fire	Button 2 Down
cursor select target	Button 3
Menu	
Action menu	Button 4 Down
down	HAT 1 Down, <DOWN>
left	HAT 1 Left, <LEFT>
right	HAT 1 Right, <RIGHT>
up	HAT 1 Up, <UP>
Radar Scope	

Table 6-8: T.Flight Hotas X mappings - rotary-wing

Function	Key/Button
down	HAT 1 Down, <DOWN>
left	HAT 1 Left, <LEFT>
right	HAT 1 Right, <RIGHT>
up	HAT 1 Up, <UP>
Release Bomb	
release	Button 1
RotorLib CGF Rotary Wing Controls	
collective	Throttle forward and back (Axis 3)
pedal	Joystick twist left and right (Axis 4)
pitch	Joystick forward and back (Axis 2)
roll	Joystick left and right (Axis 1)
wheel-brake	Button 10 Down
SAR	
request	S, Button 8

6.6.5. Gamepad Flight Control Mappings for Fixed-Wing Entities

Figure 6-16 illustrates the fixed-wing flight controls for Gamepads.



Figure 6-16. Fixed-wing flight controls

Table 6-9 lists the flight controls for Gamepads for fixed-wing entities.

Table 6-9: Gamepad flight control mappings - fixed-wing

Function	Key/Button
Fire Missile	
fire missile	Button 8 Down Toggle
FixedWingLib CGF Flight Controls	
pedal	Axis 1 (Left thumbstick, left/right)
pitch	Axis 4 (Right thumbstick, forward/back)
roll	Axis 3 (Right thumbstick, left/right)
throttle	Axis 2 (Left thumbstick, forward/back)
air-brake	Button 2
wheel-brake	Button 1

Table 6-9: Gamepad flight control mappings - fixed-wing

Function	Key/Button
Gimbaled Sensor	
sensor-azimuth	HAT 1 Left (Up), Right (Down)
sensor-elevation	HAT 1 Up (Up), Down (Down)
sensor-reset	R
sensor-track-location	L
sensor-zoom	Button 5 (Up), Button 6 (Down)
SAR	
request	S

6.6.6. Gamepad Flight Control Mappings for Rotary-Wing Entities

Figure 6-17 shows the buttons for the F310 Gamepad for rotary-wing control.



Figure 6-17. Gamepad rotary-wing flight controls

Table 6-10 lists the flight controls for Gamepads. for rotary-wing entities

Table 6-10: Gamepad flight control mappings - rotary-wing

Function	Key/Button
Fire Missile	
fire missile	Button 8 Down Toggle
Gimbaled Sensor	
sensor-azimuth	HAT 1 Left (Up), Right (Down)
sensor-elevation	HAT 1 Up (Up), Down (Down)
sensor-reset	R
sensor-track-location	L
sensor-zoom	Button 5 (Up), Button 6 (Down)
RotorLib CGF Rotary Wing Controls	
collective	Axis 2
pedal	Axis 1
pitch	Axis 4

Table 6-10: Gamepad flight control mappings - rotary-wing

Function	Key/Button
roll	Axis 3
wheel-brake	Button 1
SAR	
request	S

6.6.7. Gamepad Flight Control Mappings for the Sensor Operator

Figure 6-17 shows the buttons for the F310 Gamepad for the sensor operator role.



Figure 6-18. Gamepad sensor operator controls

Table 6-11 lists the controls for Gamepads for the sensor operator

Table 6-11: Gamepad mappings - sensor operator

Function	Key/Button
Sensor orientation	Left thumbstick
Sensor mode	X button
Reset sensor	Y button
Focus center of screen	A button
Zoom	Right thumbstick

6.7. Head Mounted Display Controllers

The Oculus Rift and HTC Vive head mounted displays support hand controllers. This section shows the mappings for these controllers. If you do not have hand controllers, you can use the keyboard and Gamepad controls. (HMD hand controllers are not mapped in joystick settings.)

Figure 6-19 illustrates the controls on the Oculus Rift touch controller.

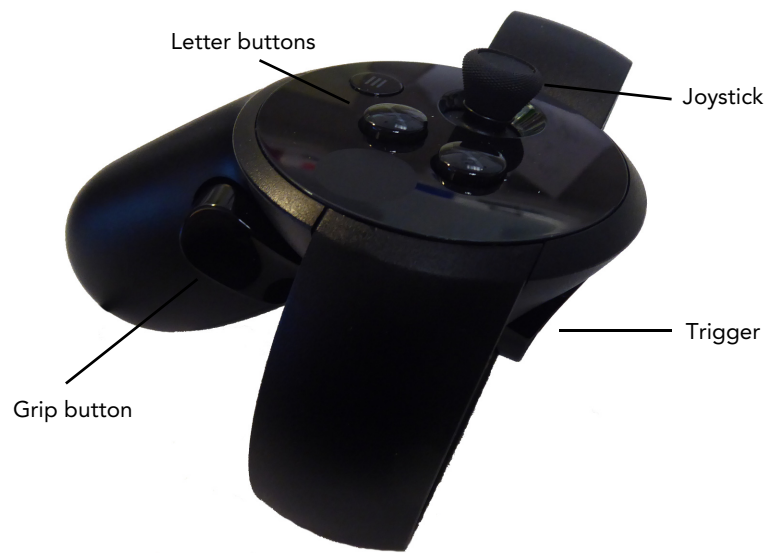


Figure 6-19. Oculus Rift touch controller

[Figure 6-20](#) illustrates the controls on the Oculus Rift touch controller.

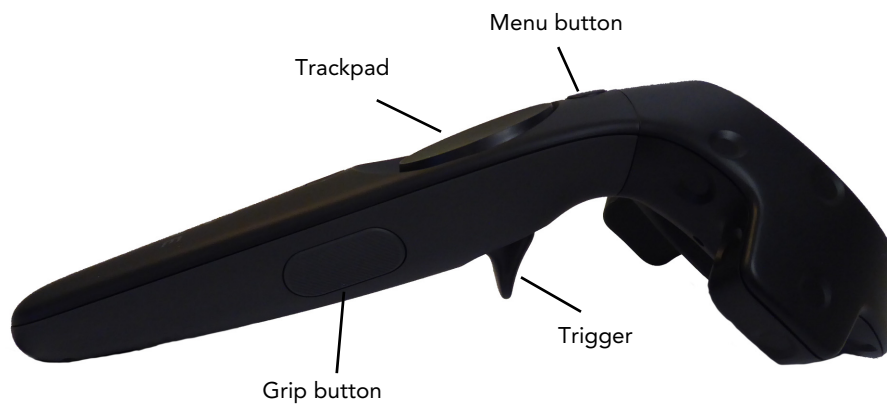


Figure 6-20. HTC Vive controller

The controls work as follows:

- ♦ Fire. Press the trigger on the dominant hand to fire the weapon.
- ♦ Aim. Press the grip button to raise the weapon to the aim-down-sights position.
- ♦ Move. Movement is controlled by the right hand joystick (Oculus Rift) or trackpad (HTC Vive), as follows:
 - Walk forward. Push/touch forward. Movement is based on the orientation of the entity, not the direction it is looking or aiming.
 - Walk backwards. Pull/touch backward.
 - Walk sideways. Push/touch left and right
 - Sprint. Push down while pressing forward.
- ♦ Turn. Press/touch the left hand joystick or trackpad to the left or right.
- ♦ Change posture. Press the trigger on the non-dominant hand for Posture Up. Press the grip button on the non-dominant hand for Posture Down.
- ♦ Action menu. To open, press Y on the non-dominant hand Oculus touch controller. Press the menu button on the non-dominant hand HTC Vive controller. While the menu is open, the joystick or trackpad acts as a D-pad.

6.8. Generic Gamepad Button Numbering

Game controllers are mapped in the Joystick Configuration page of the Application Settings dialog box. The mappings are identified by button and axis numbers. [Figure 6-21](#) identifies the button and axis numbering scheme.

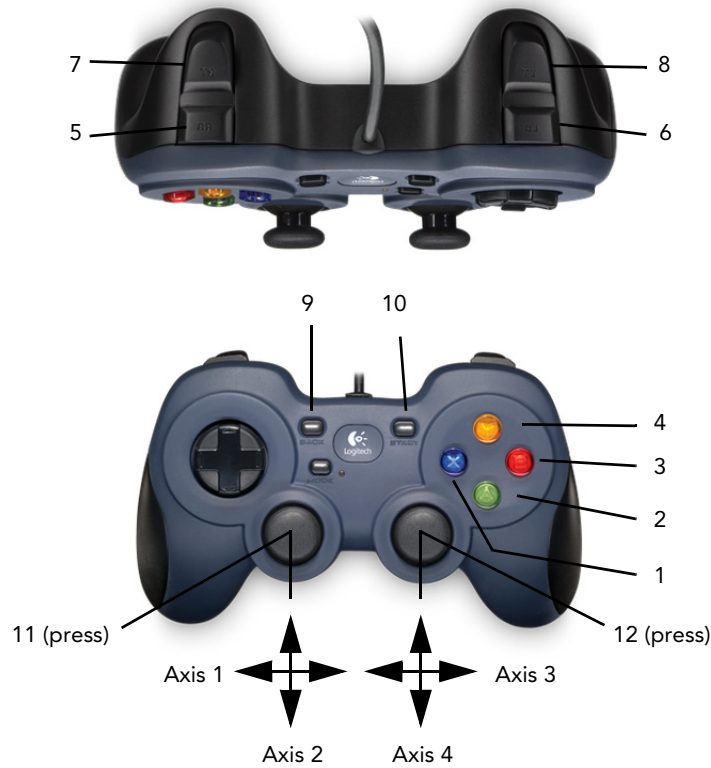


Figure 6-21. Button and axis numbering



A. Installation and Licensing

Your MAK salesperson has given you links to the VR-Engage installers, and may have given you links to other installers. Download the files.

Installing VR-Engage.....	A-2
Installing a Compatible VR-Forces and VR-Engage Add-ons	A-3
Setting Up the License Manager	A-4
Identify the Host ID and License Server Name	A-4
Put the License File in the <i>MAKLicenseManager</i> <i>Directory</i>	A-5
Run the License Server.....	A-5
Specify the License Server.....	A-5

A.1. Installing VR-Engage

VR-Engage has an application installer and a data package. The base data package has four files. You must install all four files or VR-Engage will not run properly. The default installation process installs these files automatically.

VR-Engage also has a supplementary data package that has additional terrains. The installation package includes a set of plug-ins to VR-Forces. If you are installing a VR-Forces build that is compatible with VR-Engage and want to take advantage of VR-Engage/VR-Forces integration, you must install the plug-in.

Before you install the applications, note the following possible issues:

- ♦ When you install VR-Engage, there may be a delay of up to several minutes from the time you try to run the setup program to the time that an installation dialog box is displayed. If you experience this problem, turning off User Access Control can reduce or eliminate this delay.
- ♦ These instructions assume you are familiar with installing Windows applications that use a wizard-style installer. They also assume that you have an unzipping application and know how to use it.

To install VR-Engage:

1. Run the application installer. It opens an installation wizard.
2. When the installation wizard asks how you want to install the application data package, select `Install the recommended data package automatically`. The installer will install VR-Engage and automatically install the data package.
3. Optionally, install VR-Forces and VR-Engage plug-ins, as described in [“Installing a Compatible VR-Forces and VR-Engage Add-ons,”](#) on page A-3.

A.1.1. Installing a Compatible VR-Forces and VR-Engage Add-ons

If you install a version of VR-Forces that is compatible with VR-Engage and you install the VR-Engage plug-ins, you can control VR-Forces simulation objects from VR-Engage.



VR-Engage 1.3 is built against VR-Forces 4.6.1. However the data package distributed with VR-Engage is newer than the one provided with VR-Forces. To ensure maximum compatibility, before you install the VR-Engage add-ons for VR-Forces, install the data package provided with VR-Engage into your VR-Forces directory. You do not have to uninstall the original VR-Forces data.

To install the data package, you can unzip and untar the files into the VR-Forces directory or you can run `./bin64/makDataSetup.exe`, select the data files to install, and select the directory to install them into.

To install VR-Forces:

1. Run the VR-Forces application installer. When the installation wizard asks how you want to install the data package, select the option to install the data package automatically.
2. In the VR-Engage root directory, run *VR-ForcesVR-EngageAdd-ons.exe*. If the add-on installer cannot find the VR-Forces directory, it displays a message. (If you installed VR-Forces on a different computer than the one on which you installed VR-Engage, copy *VR-ForcesVR-EngageAdd-ons.exe* to the computer that has VR-Forces.
3. Click OK. You are prompted to specify the VR-Forces directory to install into.
4. Specify the VR-Forces directory.
5. Click OK. Since the directory already exists, you are prompted to confirm the installation.
6. Click Yes.
7. Complete the installation wizard.

A.2. Setting Up the License Manager

To use a MAK product, you must install the MAK License Manager and get a license for your product. Before you can use a MAK product, you must obtain a valid license file and specify the license server.

- To install the MAK License Manager, run the installer.

The general procedure for configuring license management is as follows:

1. Identify the name and ID of the license server and request a license file.
2. Put the license file in the *MAK/MAKLicenseManager* directory on the license server.
3. Run the license server.
4. Specify the license server location.

A.2.1. Identify the Host ID and License Server Name

For simplicity, use the computer on which you installed VR-Engage as the license server. To find out the host ID and license server name:

1. On the Start menu, choose **MAK Technologies** → **MAK License Manager**. The MAK License Manager utility opens ([Figure A-1](#)).

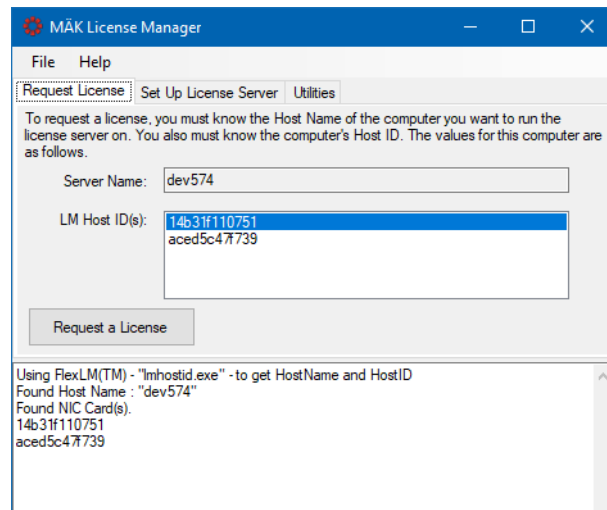


Figure A-1. License Manager

2. Select the Request License tab. It displays the server name and the IDs for your network cards.
3. If you have more than one network card, select the one that you want to use as Host ID.
4. Send the host ID and hostname to your MAK salesperson. MAK will e-mail you a license file.

A.2.2. Put the License File in the *MAKLicenseManager* Directory

When you receive your license file, put it in the *MAKLicenseManager* directory on the license server. The file should have the extension *.lic*. If it does not, please contact keys@mak.com to clarify why it did not follow this convention.

A.2.3. Run the License Server

- To start the license server daemon, on the server machine only, execute `runLm` from the *MAKLicenseManager* directory.

Shutting Down the License Server

- To force all applications to check in their licenses and shut down the license server daemon, run `lmdown`.

A.2.4. Specify the License Server

The first time you run a MAK application on a computer, the License Setup dialog box opens (Figure A-2). It prompts you to enter the hostname of the license server and optionally, a port number.

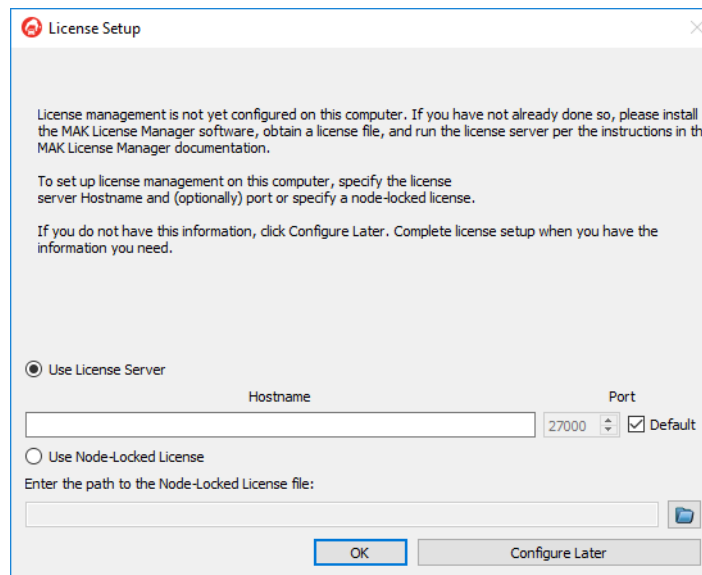


Figure A-2. License Setup dialog box

1. Type the hostname in the Hostname box.
2. Click Add License Server. The application will start.

