

Human Characters for MÄK Products 1.0

The Human Characters for MÄK Products installs DI-Guy™ and updates VR-Forces® 3.11, the VR-Forces 3D Front End 1.0, and MÄK Stealth 6.2 to support integration of DI-Guy's high-fidelity human characters and animations in these applications.

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1. Introduction

Human Characters for MÄK Products adds realistic, animated, human characters to your MÄK applications, by integrating Boston Dynamics' DI-Guy software. Human Characters for MÄK Products installs DI-Guy and updates VR-Forces, the VR-Forces 3D Front End, and the MÄK Stealth to allow these MÄK products to seamlessly integrate and use DI-Guy models.

A new VR-Forces plug-in allows you to assign DI-Guy animations and appearance characteristics to lifeforms. VR-Forces sends this information over the network and the Stealth, 3D Front End, and any other applications that support DI-Guy characters will display corresponding DI-Guy models and behaviors.

The MÄK Stealth and VR-Forces 3D Front End already had the ability to display DI-Guy models, *if* you installed DI-Guy, and *if* you updated Stealth and 3D Front End configuration files. However, Human Characters for MÄK Products does all this for you, with no effort on your part.

All you have to do to benefit from the realism of using DI-Guy is to install Human Characters for MÄK Products. There is no additional cost, licensing, or configuration required.

2. Systems Supported

Human Characters for MÄK Products 1.0 is compatible with:

- ♦ VR-Forces 3.11, Windows XP, MSVC++ 7.1 and 8.0
- ♦ VR-Forces 3D Front End 1.0 for VR-Forces 3.11, Windows XP, MSVC++ 7.1 and 8.0
- ♦ MÄK Stealth 6.2, Windows XP, MSVC++ 7.1 and 8.0
- ♦ DI-Guy 9.0.4
- ♦ DI-Guy Data 9.0.3.

Human Characters for MÄK Products supports DIS and HLA 1.3, RPR FOM 2 with DI-Guy.

3. Installing Human Characters for MÄK Products

The Human Characters for MÄK Products installation package has three files – the master installer (similar to *humanCharacters-MAK1.0-xxx-setup.exe*), which installs the DI-Guy application and Stealth and VR-Forces plug-ins, and two CD images for the DI-Guy data. For FTP links to these files, please contact your MÄK salesperson.

The installer is actually a series of product installers that are chained together. Human Characters for MÄK Products installs DI-Guy and updates the following MÄK applications as indicated:

- ♦ VR-Forces 3.11 – installs front-end and back-end plug-ins and configuration files. This includes new OPE files for lifeforms. The front-end plug-in adds a DI-Guy Animation task and a Set DI-Guy Appearance set data request to the Task and Set menus in the 2D and 3D front-ends. Versions of the Entity Editor and OPD Editor that support editing the DI-Guy characteristics of lifeforms are also installed.
- ♦ VR-Forces 3D Front End 1.0 for VR-Forces 3.11 – installs updated model mapping and ACF files and the DI-Guy Appearance Randomizer.
- ♦ MÄK Stealth 6.2 – installs updated model mapping and ACF files, and the DI-Guy Appearance Randomizer.



The Human Characters for MÄK Products installer assumes that you have already completely installed the MÄK products that will use DI-Guy. For VR-Forces in particular, this means that you have already installed VR-Forces, the VR-Forces 3D Front End, and the B-HAVE Module (if you are going to use it).

If you have the MÄK Stealth and the B-HAVE Module, install the Stealth before you install B-HAVE.

If you install the VR-Forces 3D Front End or the B-HAVE Module after you install Human Characters for MÄK Products, important DI-Guy files will be overwritten and it will not work correctly.

To install Human Characters for MÄK Products:

1. If you obtained Human Characters for MÄK Products via FTP, run the master installer. If you received Human Characters for MÄK Products on a MÄK product DVD, select Human Characters for MÄK Products on the installation screen.
2. Begin to page through the installation wizard.
3. On the Select Components page, select the product updates that you want to install. Do not install a MÄK component if you do not already have that MÄK product installed.

4. For the most part, the instructions displayed by the product installers are self explanatory. However, the following paragraphs describe installer prompts for which you may want additional explanations:

DI-Guy Installer

- ♦ The DI-Guy installer has instructions for obtaining and installing a DI-Guy license. Ignore these instructions. You do not need a license to run Human Characters for MÄK Products.
- ♦ When the DI-Guy installer detects the presence of the CD image for DI-Guy-Data-CD2, it asks you if you want it to automatically install the CD. Select Yes.

MÄK Installers

- ♦ The MÄK product installers assume that VR-Forces and the Stealth are installed in the default directories. If you installed them elsewhere, you must specify the correct directory.
- ♦ The VR-Forces and Stealth files are installed into an existing directory. When the installer asks if you want to install into these directories, select Yes.

Installing the Appearance Randomizer

The MÄK Stealth and VR-Forces 3D Front-End installers ask you if you want to install the Appearance Randomizer. When a scenario has many instances of the same entity type, for example civilian female entity, they would normally be displayed with the same model and look identical. If the Appearance Randomizer is installed and enabled, when multiple entities of the same type are in a scenario, they are assigned different appearances so that they do not all look the same.

3.1. Uninstalling Human Characters for MÄK Products

Human Characters for MÄK Products does not have a master uninstaller. To remove any of its components, you must uninstall them individually. In the Add or Remove Programs applet on the Control Panel, they are listed as:

- ♦ Human Characters for MÄK Products 1.0 MSVC++x.x
- ♦ Human Characters for VR-Forces 3.11 MSVC++x.x
- ♦ DI-Guy Applications 9.0.4
- ♦ DI-Guy Data 9.0.3
- ♦ Human Characters for MAK Stealth 6.2 MSVC++x.x.

3.2. Reinstalling Human Characters for MÄK Products Components



If you need to reinstall the Human Characters for MÄK Products updates for the Stealth or VR-Forces, you must uninstall the previously installed components first. Do not install Human Characters for MÄK Products on top of a previous installation!

The Human Characters for MÄK Products installer updates Stealth and VR-Forces configuration files by adding data to the existing files. This preserves any customizations that customers have made. If you install Human Characters for MÄK Products on top of an existing installation, the DI-Guy configuration data gets added to these files again. This duplicate data can cause the applications to work incorrectly.

4. A Short Introduction To DI-Guy

Human Characters for MÄK Products includes a full installation of DI-Guy, with all of its applications and documentation. For a complete understanding of DI-Guy, please refer to the documentation provided with it. This section provides an introduction to DI-Guy to help you understand how to use DI-Guy with MÄK products.

DI-Guy provides a set of human characters. Each character can perform a set of actions that are appropriate to its nature. For example, the marshaller can perform a variety of hand and arm motions that the character needs to direct troops. A dancer can perform a variety of dance steps. Most characters share a set of common actions, such as standing, walking, running, and dying.

Characters also have a set of appearances. Appearances change how the character looks. It might have different uniforms, different ethnic dress, different hair styles, or different racial characteristics.

The easiest way to view the different actions and appearances that a character supports is to use the DI-Guy Character Viewer.

To use the DI-Guy Character Viewer:

1. Choose **Start** → **DI-Guy Applications x.x.x** → **DI-Guy Character Viewer**. The DI-Guy Character Viewer opens (Figure 1).

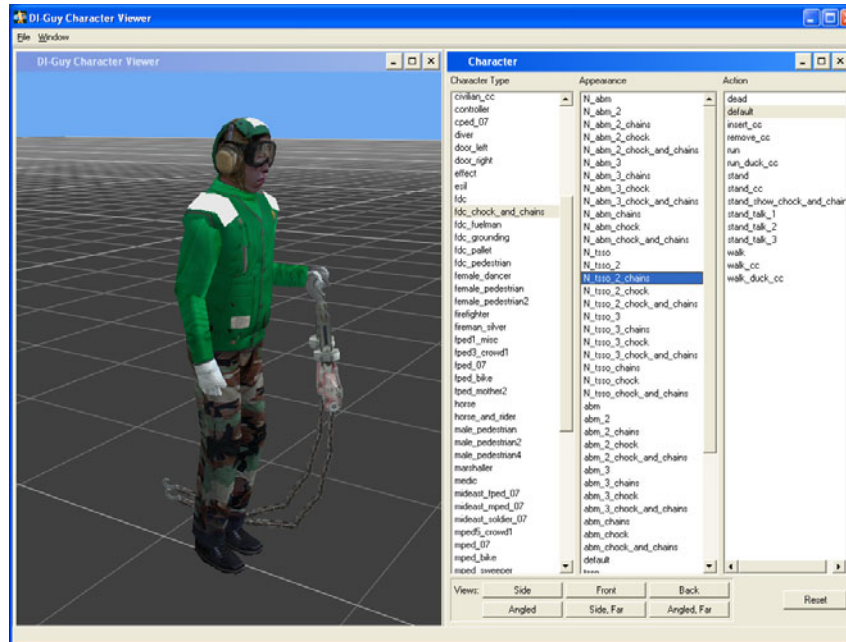


Figure 1. DI-Guy Character Viewer

2. Select a character in the Character Type column.
3. Select the various actions and appearances in the Action and Appearance columns.

4.1. How DI-Guy is Used in Applications

Applications that support use of DI-Guy characters change the actions and appearances of the displayed entities in response to intrinsic behaviors and update messages. For example, if a simulated entity is moving at a speed typical of someone who is walking, DI-Guy applies the walking action. If the simulated entity moves more quickly, DI-Guy changes the entity to the running action.

Human Characters for MÄK Products installs plug-ins for VR-Forces and an updated simulation model set that support DI-Guy characters. A subset of the complete DI-Guy character set has been added to the lifeforms available to add to scenarios. The DI-Guy Animation task lets you change the action a character is performing. The Set DI-Guy Appearance lets you change a DI-Guy character's appearance.

For actions that VR-Forces simulates, such as moving, standing, and dying, DI-Guy uses the intrinsic behaviors, as explained previously. If you assign a specific animation or appearance, VR-Forces sends a state update message over the network and the DI-Guy application responds by changing the models used in the 3D viewer.

5. Using the DI-Guy Appearance Randomizer

The DI-Guy appearance randomizer randomly assigns appearances to lifeforms in a scene. If you are viewing a scenario sent by a version of VR-Forces that has Human Characters for MÄK Products installed, you do not need to use the randomizer, because the entities in VR-Forces will already have varied appearances that are controlled by VR-Forces. However if you are viewing a simulation from a version of VR-Forces that does not support DI-Guy, a Logger file generated by a previous version of VR-Forces, or a simulation created by some other application that does not support DI-Guy, then you may want to enable the randomizer.

- To enable the DI-Guy randomizer in MÄK Stealth or the VR-Forces 3D Front End, choose **Options** → **DI-Guy Randomizer**.

6. Using Human Characters for MÄK Products in HLA

Human Characters for MÄK Products uses a modified version of RPR FOM 2 for HLA 1.3. To run the Stealth or VR-Forces in HLA 1.3, it is recommended that you use the Start menu entry that is already configured for the correct FOM and FED file.

The command line arguments that specify the FOM and FED file for Stealth and VR-Forces are:

```
vrfGui.exe -z vrfSim.exe -x VR-Link20017 --rprFomVersion
2.0017 -F VRL-DIGuy20017.fed
vrf3DGui.exe -z vrfSim.exe --lispFile
..\config\vrf3DFrontEnd.mtl -x VR-Link20017
--rprFomVersion 2.0017 -F VRL-DIGuy20017.fed
stealth.exe -x VR-Link20017 --rprFomVersion 2.0017
-F VRL-DIGuy20017.fed
```

7. Using DI-Guy in VR-Forces

VR-Forces can specify the movements and appearance of DI-Guy models used in 3D visualization programs such as the VR-Forces 3D Front End and the MÄK Stealth. This section explains the new features added to VR-Forces by Human Characters for MÄK Products.

7.1. The DI-Guy Animation Task

The DI-Guy Animation task directs a DI-Guy model to engage in a one-time or repeated series of motions. VR-Forces does not simulate the actions that the model performs; it just adjusts the location and orientation of the VR-Forces entity to synchronize it with the model's animated behavior. To change a model's appearance, use the DI-Guy Appearance set data request. For details, please see [“The Set DI-Guy Appearance Set Data Request,”](#) on page 9.

To specify a DI-Guy animation:

1. Select the entity whose behavior you want to animate.
2. Choose Task → DI-Guy Animation. The DI-Guy Animation dialog box opens.
3. In the Choose Animation drop-down list, select an animation.
4. In the Animate group box, specify the duration of the animation.
5. Click OK.



The VR-Forces DI-Guy animations are mapped to DI-Guy actions. For most animations, the name is descriptive enough to make it clear what an entity will do when assigned that animation. However, if you are not sure what a particular animation does, you can open the DI-Guy Character Viewer and view the actions available for each character.

7.2. The Set DI-Guy Appearance Set Data Request

The Set DI-Guy Appearance set data request changes the appearance of an entity's 3D model. There are many types of appearances. In general they affect how an entity looks, not how it moves. To change a model's animation, use the DI-Guy Animation task. For details, please see [“The DI-Guy Animation Task,”](#) on page 8.



The DI-Guy Appearance set data request applies only to lifeform entities.

To set a DI-Guy model's appearance:

1. Select the entity whose appearance you want to change.
2. Choose Set → DI-Guy Appearance. The DI-Guy Appearance dialog box opens.
3. Select an appearance from the drop-down list.
4. Optionally, in the 3D Front End only, select Apply Selected Appearance Immediately. The entity will display the appearance that you have selected from the list. You can use this setting to preview appearances before you click OK.
5. Click OK.



The Appearance list uses the DI-Guy appearance codes. Unfortunately they can be somewhat cryptic. If you want to see what the various appearance codes are for an entity, you can open the DI-Guy Character Viewer and view the appearances available for each character.

7.3. Editing a Lifeform's DI-Guy Character, Appearance, and Animation

The DI-Guy characters and the appearances and animations available for each character in the VR-Forces GUI are determined by the entries for each lifeform in the object parameter database. You can edit the DI-Guy characteristics for lifeform entities in the Entity Editor.

To specify the default DI-Guy characteristics for a lifeform:

1. Open the Entity Editor. (Choose **Start** → **Programs** → **MÄK Technologies** → **VR-Forces 3.11** → **Tools** → **Entity Editor**.)
2. In the Categories drop-down list, select the Lifeform category (Figure 2).

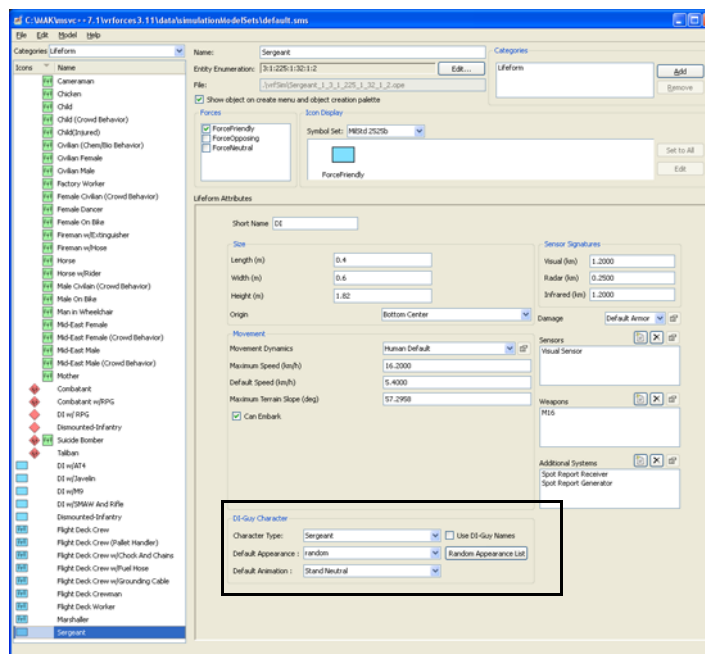


Figure 2. Entity Editor, Lifeform category

3. Select an entity in the entity list.
4. In the DI-Guy Character group box, select the default character from the Character Type drop-down list.
5. Select the default appearance from the Default Appearance drop-down list. One of the default options is to use a random appearance.
6. If you selected random appearance, optionally, specify the list of appearances to choose from. For details, please see [“Configuring the Random Appearance List,”](#) on page 11.
7. Select the default animation from the Default Animation drop-down list. The default animation is the animation the entity uses if it is not tasked and if it has a posture and speed that is appropriate to the animation.

Configuring the Random Appearance List

If you specify that a lifeform use a random appearance for DI-Guy models, then VR-Forces chooses from a list of appearances when it specifies the appearance to use. By default, the list is all appearances available for the chosen character. However some appearances might not be appropriate for a scenario, so you can specify a subset of appearances to use.

To configure the random appearance list:

1. In the DI-Guy Character group box, click the Random Appearance List button. The Appearances dialog box opens. The appearances available for the character type are listed.
2. Check the appearances that you want to include in the random appearance list.
3. Clear any appearances that you do not want to include in the random appearance list.
4. Click OK.

7.4. DI-Guy Configuration Files

The DI-Guy characters, appearances, and animations available to lifeforms are controlled by two configuration files:

- ♦ *./config/character_animations_table.mtl* lists the DI-Guy characters available for VR-Forces entities and the appearances available for the character. This information is used to populate the drop-down lists in the Entity Editor. You can edit this file to add additional DI-Guy characters to those already configured for VR-Forces. The syntax of entries is described in the file.



Any characters you add to *character_animations_table.mtl* must be valid DI-Guy characters that are already in *character_digest.xml*. You cannot make up new types of characters.

- ♦ *./config/character_digest.xml* contains information that VR-Forces needs to synchronize an entity's simulated location with the movements generated by DI-Guy animations. For example, if a model's animation causes the model to step to the left, VR-Forces needs to move the simulated location of the entity the same distance to the left.

8. Known Problems

Human Characters for MÄK Products 1.0 has the following known problems:

- ♦ If you give a DI-Guy character an animation task that involves kneeling just once, it may appear that the entity is performing the kneeling animation task indefinitely. However, what is actually happening is that the entity is now in a new static kneeling posture, which looks very similar to the kneeling animation. The value of “LifeForm State” in the entity's Information window will now be “Kneeling”.
- ♦ Certain DI-Guy entities such as the Horse and Bicycle are closer in nature to ground vehicles than lifeforms, but we are currently modeling them as lifeforms. This can produce some unexpected behaviors. Unlike most lifeforms, they should not have an instant turn radius, and they should not always stand up straight on slopes. And because we are modeling them as lifeforms, they have the ability to move about in terrain containing B-HAVE path data in the same way as any lifeform would. This includes going inside building and up and down stairs.
- ♦ The Sergeant entity does not appear to aim before firing. This is because the DI-Guy character is not configured with an animation for aiming.
- ♦ The color of the horse model varies slightly depending on the zoom level.
- ♦ DI-Guy entities are always aligned in the direction of gravity, which may look strange when an entity is moving over a steep surface.
- ♦ Tactical graphics can sometimes interfere with the display of certain DI-Guy models. Specifically, when an area exists in the same space as a rider on a bicycle, it is possible for the bicycle not to render. The rider appears to be floating in space over an invisible bicycle. The bicycle becomes visible when zoomed in.
- ♦ When you create a lifeform, a dummy model is displayed in the 3D Front End, until you left-click in the map area to place it. Once the entity is placed, the correct DI-Guy model is displayed. Similarly, whenever you drag a DI-Guy entity in the display to reposition it, the same dummy model is displayed until you release the left mouse button.