M9 PISTOL

MODEL DESCRIPTION DOCUMENT (MDD)

Version 1.0

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DOCUMENT REVISION HISTORY

Version	Description	Date
0.1	Draft	01/07/15
1.0	Initial Release	09/11/15

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1   MODEL OVERVIEW

1.1   DESCRIPTION

This document details the 3-Dimensional (3D) model of the M9 Pistol commonly used by U.S.forces. The M9 Pistol weapon model can be used with any of the characters and with a set of animations (see the specific character and animations Model Description Documents for more information). The M9 Pistol weapon model can be attached to specific attach points on the character models. During runtime, weapons are attached and detached to the character model by the 3D visualization system. This model can be used with any visualization system that can import FBX or COLLADA formats.

The M9 Pistol weapon model was developed by Dignitas Technologies for the SE Core DT Phase III Small Business Innovative Research (SBIR) project. The model is part of a larger set of character and weapon models, and animations, developed to support the LVC-IA AAR 3D Viewer.   The model design was based on internet research of the M9 Pistol. To meet the LVC-IA AAR performance requirement, a medium fidelity model was developed.

1.2   REFERENCES

- 3D_Model_Development_Process.docx
  - The 3D model development process details Dignitas Technologies' procedure for building 3D weapons and animations.
- Dignitas_Lifeform_Model_Specification.docx
  - The weapon model specification provides the requirements for developing 3D weapon models and attachments.

Figure 1 M9 Pistol Weapon Model

1.3   MODEL VERSION AND HISTORY

Information about the model version can be found in the "Model_Version.txt" file located in the model's directory (same directory the model's .fbx file is located).

Table 1 Weapon Revision History

Version	Description	Date
1.0	Initial release of the M9Pistol_skelmesh.fbx	10/03/14

1.4   MODEL SUMMARY

Table 2 Model Summary

Model Name	M9Pistol_skelmesh.fbx
Model Units	Meters
Model Length	.85 Meters long or 85 Centimeters
Coordinate System	Cartesian X, Y, Z (see Figure 2 below)
Model Origin	Origin is located at center mass inside the trigger well. (0, 0, 0) (*See figure 2 below*)
Model Orientation Runtime	Forward: Positive Y Up: Positive Z
Model Orientation Maya	Forward: Negative Z Up: Positive Y

Figure 2 M9 Pistol Origin on Cartesian X, Y, Z Coordinate System

1.5   LICENSING/RIGHTS

Models built by Dignitas Technologies along with all files and documentation, have full Government Purpose Rights.

2   MODEL ATTRIBUTES

2.1   POLYGON ALLOCATION

Polygon allocation is the number of triangles and vertices for a given state and Level of Detail (LODs) in the model. The method for calculating the number of polygons is to gather each model state then count the polygons present in each representation. Animations are not included in the polygon allocation. The M9 Pistol weapon model has a single LOD which is labeled LOD0.

Table 3 Polygon Allocation

Model	# of Triangles	# of Vertices
M9 Pistol	668	334

2.2   LEVEL OF DETAIL (LODS)

Dignitas supports only one LOD (LOD0) and no switch distances at this time.

2.3   TEXTURE MAPS

Textures:

- M9Pistol_COL.dds (Diffuse) 1024 x 1024 pixels
- Texture Version: 1.0

Figure 3 M9 Pistol Texture Map

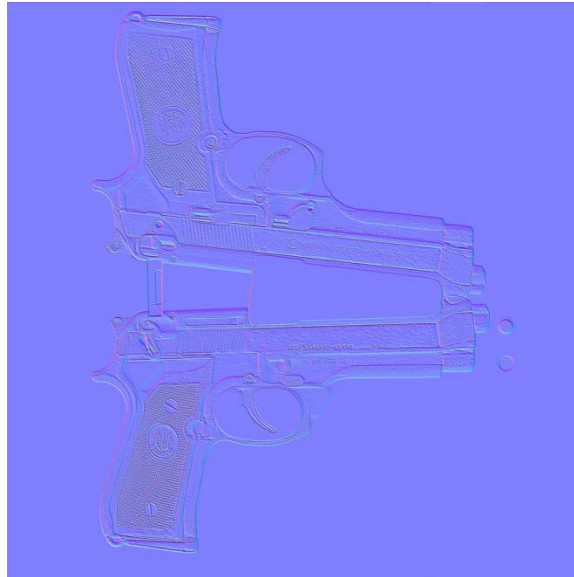- M9Pistol_NRML.dds (Diffuse) 1024 x 1024 pixels
- Texture Version: 1.0

2.4   SENSOR VIEWS

Not applicable at this time.

2.5   MODEL STATES

Not applicable at this time.

2.6   SKELETAL STRUCTURE

2.6.1   JOINTS IN THE RIG

A **rig** is a skeleton that attaches to the 3D model to allow for animations to be added. The **joints** in the rig hold the translation and rotational data from the animations.

Naming convention for joints:

foregrip
pistolgrip
buttstock
muzzle

2.6.2   ATTACH POINTS AND ATTACH MODELS

Attachments are external models, such as weapons, cell phones, etc, that can be combined with character models at certain **Attach Points** for animations.

Attach Points are unweighted joints on the character model rig that represent locations where **Attachments** can be connected.

These Attachments are combined with character models during runtime based on the animation applied to the character model rig.   Table 5 lists all Attach Points, associated Attachments, and corresponding animations for this weapon model.

Table 5 Attached Models

Attach Point (on Rig)	Attach Model	Animations
RightUpLeg	M9Pistol (foregrip)	All stowed animations
RightHandWeaponAttach	M9Pistol (foregrip)	All WeaponAtReady and WeaponFiring animations
RightHandWeaponAttach	M9Pistol (pistolgrip)	Incapacitated and Killed animations

3   ANIMATIONS

The animations listed below are associated with this weapon when it is attached to a character model. For additional animations compatible with this weapon, or more information on those listed above, please refer to the Animation MDDs.

- Walking
- Running
- Crawling
- Standing
- Kneeling
- Prone
- Incapacitated
- Crouching

- Killed

4   VERIFICATION APPROACH

4.1   RUNTIME SYSTEMS

This 3D model, associated accessories and weapons, and animations were tested using the following:

- Veritas 3D Viewer v1.13
- Veritas Model Viewer v1.4
- FBX Viewer 2013.3
- OneSAF v8.0

5   LIMITATIONS

No limitations

6   CONTACT INFORMATION

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