

VRML NODES AND FIELDS MAY BE USED FOR IR SIGNATURE SCENE MODELLING AND SIMULATION

IR Signature Scene	VRML Nodes and Fields	Remarks
Objects location and motion	“ <i>translation</i> ” and “ <i>rotation</i> ” fields	Movement of target, missile and flare in a 3D virtual world may be controlled
Shapes of objects	“ <i>geometry</i> ” nodes	Any 3D shape may be modelled using different geometrical shapes
Size of objects	“ <i>scale</i> ”	Size of an objects may be changed as per requirements
Objects with same radiometric properties	“ <i>DFE</i> ” and “ <i>USE</i> ” node	Plan one “ <i>DFE</i> ” node (short of “define” to define a name for a node) in the start and call it for different objects by “ <i>USE</i> ” node
Several targets of same type but with different appearance	Proto-type	Create copies of objects with customized parameters
Landmarks, hills (terrain)	“ <i>elevationGrid</i> ” node	Irregular terrain may be modelled in 3D virtual world
Sky and ground as background	“ <i>background</i> ” node	Multi-layer sky and uniform ground may be modelled
Temperature of objects	“ <i>emissiveColor</i> ” field	Temperature of objects may be modelled as fake colours
Total radiance of objects	“ <i>emissiveColor</i> ” field	“ <i>emissiveColor</i> ” that the object gives off even when no light source is present
Reflectivity (sun shine, earth shine, sky shine)	“ <i>ambientIntensity</i> ” “ <i>shininess</i> ” “ <i>specularColor</i> ” and light source	The sun shine, earth shine and sky shine may be modelled
Exhaust gas plume (transmissivity)	“ <i>transparency</i> ”, “ <i>emissiveColor</i> ” and background colour	Modelling exhaust gas plume as co-centric cones and controlling transparency
Atmospheric attenuation or atmospheric transmittance	“ <i>fog</i> ” node (exponential)	Atmospheric attenuation may be modelled using exponential fog
Seeker FOV	“ <i>FOV</i> ” field of viewpoint node	The viewpoint FOV may be used to modelled vertical FOV of the seeker optics

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Missile target collision	“ <i>NavigationInfo</i> ”, “ <i>collision</i> ” and “ <i>avatarSize</i> ”	Hit criterion may be modelled using collision node and avatar size of “ <i>NavigationInfo</i> ” node
Missile-LOS view, launcher view, seeker head view	“ <i>viewpoint</i> ” node	Multiple viewpoints may be modelled to analyse the simulation from different aspects
Day and Night mode (visible and night vision)	“ <i>emissiveColor</i> ”, “ <i>diffuseColor</i> ” and light source	Switching on and off light source can model day and night mode
Scattering in or out	“ <i>ambientIntensity</i> ” and “ <i>attenuation</i> ” of light source	Modelling indirect lighting effects due to invisible source
Multi-band or dual color (IR, UV, visible, MWIR, LWIR etc.)	Colour of light	Using different colour of light to represent different wavebands
Laser source	“ <i>Spotlight</i> ”	Narrow beam light source may be used to model Laser source
Sub-target details	“ <i>LOD</i> ” node	Increasing level of details as range decreases
Simulation	Travel in time, “ <i>script</i> ” node	Modelling animation of events
Sun, moon as source in the scene	Light source geometry, “ <i>emissiveColor</i> ”	Sun can be modelled as sphere with “ <i>emissiveColor</i> ” linked with light source at same place
Lock-on range, maximum range	“ <i>visibilitylimit</i> ”, radius of light	Modelling maximum range using “ <i>navigationInfo</i> ” node
Shining leading edges	“ <i>shininess</i> ” and “ <i>specularColor</i> ”	Modelling leading edge reflection using specular colour
Cold sky reflections	“ <i>ambientIntensity</i> ” “ <i>shininess</i> ” “ <i>specularColor</i> ” and light source	The cold-sky reflections may be modelled by placing a light source in sky and altering material filed of glass canopy
Impact or proximity fuse	“ <i>collision</i> ” node “ <i>avatarSize</i> ” field and “ <i>proximitySensor</i> ”	Modelling impact and proximity fuse for missile impact
Modelling clouds and smoke	“ <i>Geometry</i> ”, “ <i>extrusion</i> ” “ <i>transparency</i> ”, “ <i>emissiveColor</i> ” and background colour	Modelling shape of clouds as multiple layers and controlling transparency
IR Flare plume	“ <i>Geometry</i> ”, “ <i>transparency</i> ” and “ <i>emissiveColor</i> ”	Modelling flare plume as multiple layers of cones and controlling material fields