Scenario Documentation

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Contents

Chapter 1

Scenario Documentation

1.1 Scenario Documentation

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                                                                  12  ↩
                                                                     September
                                                                       ↩
                                                                     1996 ↩


  R a y S t o r m    S c e n a r i o
v1.0b
                     by Andreas Heumann and Mike Hesser


 Introduction
     What is Scenario?

 Requirements
     What do I need to run it?

 Features
     What can Scenario do?

 Installation
     How can I install it?

 Usage
     How do I use Scenario?

 Structure
     Some general informations to directory and project structures ↩
         .

 Menus
     Description of the menus.

 Buttons
     Description of the buttons.

 Object Menus
     Description of object orientated menus.
```

1.2 Introduction

INTRODUCTION

This document decribes the scene modeler Scenario, which is part of the RayStorm package. Scenario is the graphical user interface (GUI) of the raytracer RayStorm.

As we developed Scenario we tried to make the user interface to use as easy as possible to enable even absolute beginners to work with it. Therefore almost all actions can be performed with the mouse. For advanced users we implemented keyboard shortcuts for almost all functions.

1.3 Requirements

REQUIREMENTS

(1) You will need at least Kickstart 2.0.

(2) 881-version: 68020 processor and a mathematical coprocessor
    (68881/882 or internal 68040/060 version).

```
(2) 020-version: 68020 processor (no math coprocessor needed)

(4) 000-version: 68000 processor (should even run on a Amiga 500
    (not tested))

(5) 1MB RAM minimum

(6) RayStorm was written using MUI. Therefore you need muimaster.library
    V3.0 or better to run RayStorm.

recommended: 68030, 68882, Harddisk, GFX-Board

The faster the better :-).

Tested with:
A1200 68030/50, 6MB, 200MB HD
A2000 68040/30, 9MB, 250+250MB HD, Merlin Gfx-board
A2000 68030/14, 68882/20, 4MB, 730+52MB HD
A4000 68030/25, 68882/57, 10MB, 730+80MB HD, Cybervision 64 Gfx-board
```

1.4 Features

```
FEATURES

- create spheres, planes, lightsources and cameras
- unlimited amount of cameras to view scene from different directions
- define surfaces for all objects, including brushes and textures
- load external objects (Imagine TDDD files, AutoDesk 3DS files and RAW files)
- save and load scenes
- render scenes with RayStorm
- preview of renderd scenes
- quadview
```

1.5 Installation

```
INSTALLATION

There is a installation script included in the archive which uses the
Commodore Installer. Run it to install RayStorm Scenario.
```

1.6 Usage

```
                USAGE

After you have started Scenario you see the worksheet.

At the top of the sheet are the buttons to control view mode, display mode,
edit mode and currently active directions. Here you also can see the
coordinate display.
```

Below this button bar is the work area. At startup you can see a grid in the middle and the camera (note: there must always remain at least one camera in the scene).

All objects, cameras and light sources have a axis to handle it. The axis consist of a rectangular area - the hot spot or handle - and three lines which show the orientation of the axis. The axis can be selected by clicking with the left mouse button at the handle. If it is selected the color of the axis and the object changes.

Clicking with the left mouse button invokes the modify mode. According to the slected mode (move, rotate or scale) the world or the selected object(s) can be modified.

Clicking with the right mouse button opens object specific menus (see

Object Menus
).

1.7 Directory and Project Structure

DIRECTORY AND PROJECT STRUCTURE

```
scenario              the root directory of scenario
|-brushes             the brush directory (you can create subdirectories here)
| |- brush 1
| |- brush 2
| |- ...
| |- brush n
|-objects             the objects directory (you can create subdirectories here)
| |- object 1
| |- object 1
| |- ...
| |- object n
|-textures            the textures directory (you can create subdirectories here)
| |- texture 1
| |- texture 2
| |- ...
| |- texture n
|-projects            the projects directory (Scenario creates for every project a ↩
   subdirectory)
  |-project 1         the first project
  | |- project.scn    the file where the scene is stored (has always this name)
  | |-brushes         the directory for brushes which are local to this project
  | | |- ...
  | |-objects         the directory for objects which are local to this object
  | | |- ...
  | |- pic.0001       the rendered pictures
  | |- pic.0002
  | |- ...
  | |- pic.n
  |- project 2        another project
  |- ...
  |- project n
```

```
The default project directory can be set with the
                preferences
                .
```

1.8 Menus

```
                MENUS

  Project

                 New

                 Open...

                 Save

                 Save As...

                 Render...

                 About...

                 Quit
                  Edit

                 Cut

                 Copy

                 Paste

                 Delete

                 Select all

                 Deselect all

                 Select next

                 Select previous

                 Mode

                 Active
                  View

                 Redraw

                 Focus

                 Zoom in

                 Zoom out

                 Zoom fit
```

```
View

Grid

Snap to Grid

Gridsize...

Show

Global settings...
 Object

Attributes...

Transform...

Load...

Create

Active Camera...

Browse...
 Settings

Prefs...

MUI...

Load

Save
```

1.9 New Project Menu

```
NEW PROJECT

Deletes all objects and creates the default camera.
```

1.10 Open Project Menu

```
OPEN PROJECT

Load a new scene.
```

1.11 Save Project Menu

SAVE PROJECT

Save the current scene.

1.12 Save Project As Menu

SAVE PROJECT AS

Save the current scene with the specified name.

1.13 Render Project Menu

RENDER PROJECT

Opens the render requester. At top of the requester you can select the render resolutions with a listview or enter the values to the numeric fields. The values range from 0 to 65535. Here you also can set the rendering field. RayStorm renders only inside this field. The field is shown in the perspective window if camera view is switched on.
The 'Quick' flag selects the quick rendering mode. In this mode RayStorm don't calculates shadows, transparency or reflections.
The 'Octree depth' slider sets the maximum depth of the octree which RayStorm uses. For almost all scenes a vlaue of three is the best, but in complex scenes it may be better to use higher values. The higher this value is the longer takes the initialazion phase and the more memory is needed.
The 'Filename' string gadget sets the filename of the generated picture and the cycle gadget sets the fileformat. You can show the rendered picture with the view button.
The 'Ok' button closes the requester and stores the current settings, whereas the 'Cancel' button don't changes the settings.
The 'Render' button starts the rendering of the current scene.

1.14 About Menu

About

Shows the about requester with the version number and the current Arexx port name.

1.15 Quit Menu

QUIT

Quits Scenario.

1.16 Edit Cut Menu

CUT

Moves the currently selected objects to the paste buffer.

1.17 Edit Copy Menu

COPY

Copys the currently selected objects to the paste buffer.

1.18 Edit Paste Menu

PASTE

Copys the currently selected objects from the paste buffer to the scene.

1.19 Edit Delete Menu

DELETE

Deletes the currently selected objects.

1.20 Edit Select All Menu

SELECT ALL

Selects all objects.

1.21 Edit Deselect All Menu

DESELECT ALL

Deselects all objects.

1.22 Edit Select Next Menu

SELECT NEXT

Selects the next object.

1.23 Edit Select Previous Menu

SELECT PREVIOUS

Selects the previous object.

1.24 Edit Mode Menu

MODE

Sets the edit mode:
Move object
Rotate object
Scale object

Move world
Rotate world
Zoom world

1.25 Edit Active Menu

ACTIVE

Sets the active directions:
X, Y, Z.

1.26 View Redraw Menu

REDRAW

Redraws the work area.

1.27 View Focus Menu

FOCUS

Sets the zoom factor so that all selected objects are visible.

1.28 View Zoom in Menu

ZOOM IN

Zooms out by factor two.

1.29 View Zoom out Menu

```
ZOOM OUT

Zooms in by factor two.
```

1.30 View Zoom fit Menu

```
ZOOM FIT

Sets the zoom factor so that the whole scene is visible.
```

1.31 View View Menu

```
VIEW

Sets the view mode:
Front, Right, Top, Perspective, Four, Camera.
```

1.32 View Grid Menu

```
GRID

Switches grid on/off.
```

1.33 View Snap to Grid Menu

```
SNAP TO GRID

Switches grid snapping on/off.
```

1.34 View Gridsize Menu

```
GRID SIZE

Sets grid size.
```

1.35 View Show Menu

SHOW

    Coordinates
    Names
    Brushes
    Textures

1.36 View Show Coordinates Menu

SHOW COORDINATES

Switches coordinate display on/off.

1.37 View Show Names Menu

SHOW NAMES

Sets the show names mode on/off.

1.38 View Show Brushes Menu

SHOW BRUSHES

Sets the show brushes mode on/off.

1.39 View Show Textures Menu

SHOW TEXTURES

Sets the show textures mode on/off.

1.40 View Global Menu

Global

Opens the global settings requester. Here you can change the global scene settings.

The 'Background' colorfield sets the color of the background of the rendered picture.

At the 'Backdrop' string gadget you can enter a picture which will replace the background. Note: the resolution of this picture has to be the same as the resolution of the rendered picture.

The 'Reflectionmap' string gadget sets the name of a picture which will be reflected by objects instead of the background. The reflectionmap is even applied in quick mode.

The 'Ambient' colorfield sets color of the ambient light which is the base brightness of all objects. In other words: surfaces which are not illuminated by a light source get the ambient color.

The next group of gadgets set the antialiasing parameters. The antialiasing value ranges from 1 (no antialiasing) to 8 (very high antialiasing). This value is the squareroot of rays per pixel. Filter width sets the maximum distance from the main ray to the additional generated rays in pixels. The 'Contrast' colorfield sets the minimum contrast. If the contrast of the main pixel against its four neighbours is higher than this color, RayStorm performs antialiasing at this pixel.

The global fog parameters are controlled with the gadgets of the next group. 'Length' sets the thickness of the fog. The 'Color' colorfield determines the color of the fog. 'Height' sets the height at which the fog ends. Global fog always starts at negative infinity in y direction and and at the specified y position. For more informations about fog click here.

The 'Motionblur level' slider is not activated in this version of Scenario, because motionblur needs animated objects.

The 'Softshadow level' slider sets the squareroot of the amount of additional casted rays for softshadow. Soft shadows are caused from light sources with a size bigger than 0.

The 'Random jitter' flag switches between normal and random sampling. With random sampling the sampling position is calculated randomly.

1.41 Object Attributes Menu

ATTRIBUTES

Opens the attribute requester for the currently selected object, if no object is selected no requester is opened.
Here you can set the parameters which determine the apperance of the surface.
The requester is divided into three groups:
- Surface
  At this page you can set the base apperance of the surface.
  - Diffuse
    The diffuse reflection falls off as the cosine of the angle between the normal and the ray to the light. Diffuse reflection determines the main color of the object.
  - Ambient
    This determines the color of the object in sections which are in shadow.
  - Specular
    Specularly reflected highlights fall off as the cosine of the angle between the reflected ray and the ray to the light source.
  - Diffuse Transmission
    Same as diffuse reflection, but only used if the lightsource is on

```
    opposite side of surface. Only applied if tranlucency is not 0.
  - Transparence
    Transparent color.
  - Specular Transmission
    Same as specular reflection, but only used if the lightsource is on
    opposite side of surface. Only applied if tranlucency is not 0.
  - Reflectivity
    Reflective color.
  - Translucency
    Specular transmittance.
  - Reflection exponent
    Determines the size of the specularly reflected highlights, the higher
    the smaller the highlight.
  - Index of refraction
    Determines how the ray through transparent objects is refracted, the
    higher the more.
  - Transmission exponent
    Same as specular reflection exponent, but only used if the lightsource
    is on opposite side of surface.
  - Fog length
  - Bright
    The brightness of the surface is everywhere the same. Light sources don't
    affect the surface, no shadows are visible on the surface, but the object
    casts shadows.
- Brush
  Brushes are pictures which are projected to the surface. They can replace
  different surface parameters as color, transparency, reflectivity and
  specularity. Additional with altitude mapping brushes can change the normals
  of the surface to simulate bumps or other structures which go 'in' or come
  'out' of the surface.
  There are three wrap methods available:
  - flat (Flat)
    The brush is projected to X-Y plane.
  - cylindrical around x- or y-axis (WrapX and WrapY)
    The brush is wrapped around the x or y-axis, like on a cylinder. The left
    edge of the brush begins at the posititve x-axis and wraps the brush around
    the cylinder from 'west' to 'east'.
  - spherical (WrapXY)
    Wrapping both: around x- and y-axis. It is assumed, that the object is a
    sphere. The y-axis is the north/south pole of the spherical mapping. The
    left edge of the brush begins at the positive x-axis and wraps the brush
    around the sphere from 'west' to 'east'. The brush covers the sphere
    exactly once.
  Additional brushes can be repeated and mirrored (only for flat or cylindrical
  mapping). If 'Soft' is selected, the color between two points of the brush is
  softly interpolated.
- Texture
  Textures are mathematical generated patterns. Textures can change color,
  reflectivity, transparency and normals of a surface. Textures are controlled
  with a set of 16 parameters.
```

1.42 Object Transform Menu

```
TRANSFORM
```

Opens the transform requester for the currently selected object.
Here you can set the name, position, alignment and size of an object.

1.43 Object Load Menu

LOAD

Loads a external object. Currently Imagine,3DS and RAW objects are supported.
Scenario generates an axis and adds the object as childs of it. It's currently
impossible to change the position, alignment or size of this child objects
directly, nevertheless changing of the parent axis also affects it's childs.

The name of the object can be changed with the
mesh settings
requester.

1.44 Object Create Menu

CREATE

Axis

Sphere

Plane

Pointlight

Spotlight

Camera

1.45 Object Axis Menu

AXIS

Creates a new axis at position <0,0,0> with size <1,1,1>. An axis can be used
to track a camera or an spot light source on it.

1.46 Object Sphere Menu

SPHERE

Creates a new sphere at position <0,0,0> with radius 1.

1.47 Object Plane Menu

PLANE

Creates a new plane at position <0,0,0> with the normal pointing in positive y direction.

1.48 Object Pointlight Menu

POINTLIGHT

Creates a new point light source at position <0,0,0>.

1.49 Object Spotlight Menu

SPOTLIGHT

Creates a new spot light source at position <0,0,0> with a opening angle of 45 degree pointing in negative y direction.

1.50 Object Camera Menu

CAMREA

Creates a new pinhole camera at position <0,0,0> with a horizontal and vertical field of view of 25 degree witch is pointing in positive z direction.

1.51 Object Active Camera Menu

ACTIVE CAMERA

You can select the active camera.

1.52 Object Browse Menu

BROWSE

Opens the object browser. You can select objects.

1.53 Settings Prefs Menu

```
PREFS

Opens the preferences requester.

Viewer:       Sets the path and name of the viewer. This viewer is used to
              display the images generated by RayStorm. The filename of
              the image is appended to the end of the string. You have
              specify the whole path, for example not 'multiview' but
              'sys:utilities/multiview'.
Project path: Sets the default path for projects
Object path:  Sets the default path for objects.
Texture path: Sets the default path for textures.
Brush path:   Sets the default path for brushes.
```

1.54 Settings MUI Menu

```
MUI

Opens the MUI preferences.
```

1.55 Settings Load Menu

```
LOAD

Loads the preferences from a file called 'scenario.prefs'.
```

1.56 Settings Save Menu

```
SAVE

Saves the preferences to a file called 'scenario.prefs'.
```

1.57 Buttons

```
BUTTONS

The first six buttons are for selecting the view (front, right, top,
perspective, quad and camera view).

The following three buttons select the display type. (bounding box,
wireframe and solid display).

After this are six buttons to select the edit mode (move, rotate, scale object
and move, rotate, scale world).

The next three buttons enable the X, Y and Z-axis.
```

1.58 Object Menus

```
                OBJECT MENUS

Sceneario supports object oriented menus. These menus are shown when you click
the right mouse button inside the work area and hold it. Scenario then pops
up a menu. The contents of this menu depends on the object which is found at
this position.

World menu

The world menu is shown if you click on a place where no object is placed.
The menu contents follwing points:

Move:       switch to move world
Rotate:     switch to rotate (the virtual camera is rotated around the view
            point (only perspective mode))
Zoom:       zoom in or out
Settings:   opens the general settings requester

Object menu

The object menu pops up if you click on the handle of the object.
The menu contents follwing points:

Move:       switch to mode move object
Rotate:     switch to rotate object (the object is rotated around it's local
            axis)
Scale:      switch to scale object
Transform:  opens the
                transform
                 requester
Attributes: opens the surface
                attributes
                            requester

Camera menu

The camera menu pops up if you click on the handle of a camera
The menu contents follwing points:

Move, Rotate, Scale, Transform: see object menu
Settings:   opens the
                camera settings
                 requester
Active:     sets this camera as the active camera (the scene is viewed with
            this camera)

Light menu

Opens the light popup menu.
The menu contents follwing points:

Move, Rotate, Scale, Transform: see object menu
Settings:   opens the
                light source settings
```

```
                requester

Mesh menu

Opens the mesh popup menu.
The menu contents follwing points:

Move, Rotate, Scale, Transform: see object menu
Settings:   opens the
                Mesh settings
                 requester
Attributes: see object menu
```

1.59 Camera Settings

```
CAMERA SETTINGS

With the camera settings requester you can set various paramaters, which
influence the camera.

With Track yue can set the name of an object the camera will track to.
This means that the camera will always point to the axis of the track object.

Focal distance and Aperture set the parameters for
Depth of Field.

With the values of Horizontal and Vertical field of view you
can set the opening angle of the camera lens. If you activate the button
Take VFOV from resolution Scenario calculates the vertical field of
view (VFOV) from the resolution and the horizontal field of view (HFOV). An
Example will demonstrate this. You selected a HFOV of 30 degree and a
resolution of 800x600 pixels. This means that the VFOV is
  600 / 800 * 30 = 22.5 degree.
```

1.60 Light Settings

```
                LIGHT SETTINGS

The light settings requester is the same for for spot- and pointlights, but
some values are not setable for pointlights.

With Track you can set the object a spotlight points to. See

                camera settings
                 for a more detailed explanation of
tracking.

Color sets the color of the light source.

Falloff is the distance where the intensity of the light source is
zero. A value of zero disables it.
```

Opening angle sets the opening angle of a spotlightsource in degree.

Cast shadows enables the light source to cast shadows.

1.61 Mesh Settings

MESH SETTINGS

With the mesh settings requester you only can change external objects, the values are disabled for normal mesh objects.

Object filename sets the the name of the external object which is attached with the mesh object.

If Apply surface to chils is activated the surface of the mesh object is applied to the surface of the attached external object.

1.62 Keyboard Control

KEYBOARD CONTROL

ESC	break redraw
cursor keys	Function depends on the curren edit mode (move, rotate, scale of world or object).
'+'	zooms in
'-'	zooms out
'm'	switches to move action
'r'	switches to rotate action
's'	switches to scale action
'o'	switches to change object
'w'	switches to change world

1.63 Known Bugs

KNOWN BUGS

- There are some problems with tracking (the view up vector is not set correct).

1.64 Legal Stuff

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1.65 Credits

CREDITS

We want to thank the following persons:

- Bernhard Moench - chairman of Plasma Pictures (a great Amiga club)

  Address:

  Plasma Pictures
  Reality and Imagination!

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  10777 Berlin
  GERMANY

- Stephan Dorenkamp - for testing

- Maan Hamze - for testing, hundrets of suggestions and bugreports...
  ... and many many E-Mails

1.66 Register

```
REGISTER

If you like RayStorm use the registration programm to register.
Fill out the registration form and press the 'Print' button.
If the printer is installed correctly, the registration is printed out.
You can get information about the current agreements by pressing the 'Info'
button.
```

1.67 Author

```
AUTHORS

For bug reports, comments, suggestions ... you can contact us at the
following addresses (E-mail prefered).

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```

1.68 PC-version

```
                PC-VERSION

The PC version is available on the Internet from our
                homepage
                .
```

1.69 History of Changes

```
HISTORY

version 1.0b (27-August-96)
- initial release.
```

1.70 Homepage

```
HOMEPAGE

Come and visit our RayStorm-Homepage! There you can always get the latest
version of RayStorm and can see some example pictures.

The address:
http://sol.wohnheim.uni-ulm.de/~calvin/raystorm.html
```

1.71 Future

```
FUTURE ADDITIONS

- create, load, save and modify triangle objects
- animation control
- Arexx port
- preview in attribute requester
- undo
- solid display (z-Buffer) (why is there no useable version of OpenGL for
  Amiga available?)
```

1.72 indexnode

```
                Copy

                Copyright

                Credits

                Cut
                -D-

                Delete
                  Depth of field
  Deselect All
-F-

                Features

                Focus
                  Fog

                Future
                -G-
  General

                Global

                Grid

                 - Size

                 - Snap to
                -H-

                History

                Homepage
                -I-

                Installation

                Introduction
                -L-

                Load

                Light Settings
                -M-

                Menus

                Mesh Settings

                Mode
                  Motion Blur

                MUI Prefs
                -N-
```

```
                New
                -O-

                Open
                -P-

                Paste

                PC-Version

                Plane

                Pointlight

                 - Settings

                Prefs
                  Prefs Load
  Prefs Save
-Q-

                Quit
                -R-

                Redraw

                Register

                Render

                Requirements
                -S-

                Save

                Save As
                  Select All
  Select Next
  Select Previous

                Show

                 - Coordinates

                 - Names

                 - Brushes

                 - Textures
                  Soft shadows

                Sphere

                Spotlight

                 - Settings
```

```
-T-

Textures
   - show

Transform
-U-

Usage
-V-

View
-Z-

Zoom fit

Zoom in

Zoom out
```