Nightshade™
NightshadeSoftware.org

Creating Scripts for Nightshade

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Introduction

Nightshade is an open source astronomy simulator designed for the planetarium and astronomy education community. It is used in literally hundreds of digital planetarium systems around the world. Nightshade can be automated using the StratoScript™ scripting language.

A Nightshade script is a text file with the extension ".sts" which contains a list of StratoScript commands. A command is an instruction telling Nightshade to perform a certain action. These commands cover just about everything you can do using the software manually, plus much more.

Scripting makes it relatively easy to create your own prerecorded segments and play these back. This allows you to automate repetitive or awkward tasks, customize aspects of Nightshade, or even create complete prerecorded lessons or shows.

How to run a script

To run a script, you bring up the text menu in Nightshade ('M') and go to section 7, Scripts (using the arrow keys). In the Community Edition, you will see local scripts which are located in the data/scripts directory where you installed Nightshade. If you have a vendor specific edition, you will be able to choose from multiple different script locations in the menu. If you have the option to use removeable media, such as a CD, DVD, or USB flash drive, scripts must be located in a "scripts" directory in the root directory of the media.

Startup script

If your edition supports removeable media, when Nightshade starts up it will automatically run a script called "/scripts/startup.sts" if one exists on the USB or DVD drive. In all other cases, "startup.sts" in the Nightshade data/scripts directory will be run. This feature makes it simple to start a prerecorded show on an automated exhibit, or to automatically load a custom landscape that you will use during a live show.

Script playback

While a script is playing you can pause ('6'), fast forward ('L'), or resume playback ('K') as needed (you can not rewind). You can also use the -7 days and +7 days time keys ('[' and ']') to adjust the audio volume. To cancel a script hit the stop key ('7').

While a script is playing, you can't use Nightshade as you normally would (for example, using the keyboard). This is to prevent confusing the script while it is running.

Special script features

Probably the most noticeable feature that scripting opens up is the ability to position images in the sky on cue. These can be positioned as 2D images or mapped onto various coordinate systems. Multiple images can move around the dome fading in and out, rotating, or scaling as needed.

One script can also run another. A script that calls itself when finished could be used as an easy way to automate multiple repeating shows over the course of a day in an unattended exhibit.

Script Examples

Here are some illustrative examples of where scripts have been used:

- Load a landscape of the local town at start-up
- A seasonal night sky show which repeats in an unattended exhibit
- Simulate an aurora using moving images
- 20 minute fulldome show with soundtrack, narration, and animated characters who take a tour of the solar system
- Visit the Moon and look back at Earth
- Go through a year one sidereal day at a time with planet trails on to show retrograde motion
- Load the 500 brightest asteroids and ride a comet past the Sun while viewing their trails

Creating a script

Creating a script is an iterative process. It is unlikely your script will work perfectly the first time unless it is very simple. Usually it will take a number of editing and retesting steps.

If you are creating a script for playback on a planetarium system, be sure to download the correct version of Nightshade as advised by the system vendor. You will also want to have a copy of the **StratoScript Command Reference** handy. This is included with Nightshade and also available from http://NightshadeSoftware.org.

For very simple scripts you can just create a .sts file in a text editor and run this in Nightshade on a desktop computer to test. If you put the file in your Nightshade data/scripts directory, it will show up as a local script in the Nightshade text menu. **Note: the file must exist before Nightshade is started or it will not appear in the script list.**

Once you have played a script and want to make changes, you can leave Nightshade running, edit your script with a text editor, and then hit the shift and then play keys (`` ` `` and then 'K') to replay the last script.

For complex scripts, we suggest this process:

1. Outline what you want to do.
2. If you are creating a narrative audio track, write out a narrative so that you can plan out your words, actions, and timings.
3. Record your audio track, if applicable.
4. On a desktop running Nightshade simultaneously start playing your audio track and recording a Nightshade script (hit CTRL-R to start or stop recording actions in Nightshade and note to what script file they are being recorded).
5. Now edit your recorded script in a text editor to add commands to play your soundtrack, set up the correct initial state for your script, or add commands that you can't record through Nightshade, such as showing images.
6. Play back your script on the desktop Nightshade. Fix any problems by editing the script. Replay and make further changes. Repeat until you are happy. On Windows computers error messages are written to debugging files called stdout.txt and stderr.txt in the Nightshade application directory. If you put the command “flag script_gui_debug 1” at the start of your script, error messages will be displayed directly on screen in Nightshade.

Potential pitfalls

Remember that you need to be very careful in your scripts to set up an appropriate initial state. For example, if your script zooms in on Venus, you need to make sure that the landscape and atmosphere are turned off. Otherwise the audience might suddenly end up zoomed in on a blade of grass because someone ran the script with a landscape on at a different time or longitude than you planned. Or imagine talking about the full night sky when the user is still zoomed in on Jupiter from a previous discussion. We strongly recommend using the “clear” command at the start of your script unless you definitely don't want to modify the user's initial state when your script is run.

When changing the file name of a script, do this with the “Save as” feature of your text editor. Using the Windows file manager can cause problems if it adds an extension (such as “.txt”) to the actual file name without your knowledge. All file references in scripts are case sensitive in order to be portable across platforms.

Also bear in mind that there are a few unavoidable differences between Nightshade on different platforms. In particular, timezones do not work on the Windows version and you will not be able to load scripts from a local CD or USB drive.

For audio, you can use a WAV file, but if you fast forward a script the audio will get out of sync with the rest of the script. We highly recommend using ogg vorbis format audio (.ogg) to avoid this problem. This is an open audio format with freely available playback and conversion tools. See http://vorbis.com. You can record your audio as a WAV file using any audio tools, and then easily convert this to an ogg format file with a conversion program.

Images must be in PNG format and need to be sized in dimensions that are powers of 2 (128x128, 512x512, 64x1024, etc.). Otherwise your image will be resized to meet this requirement and probably end up looking warped or fuzzy. If you want to preserve the correct aspect ratio you can either crop the image down and scale it to the correct

dimensions, or add a transparent border around the image to make up the difference. Don't forget that you added a transparent border, and then think that the image scaling doesn't work right.

When using the horizontal coordinate system for images, bear in mind that the images are drawn in the observer's horizontal coordinates, not the dome's horizontal coordinates. In other words, if you zoom in on a planet, odds are you won't see any of your images, as the observer's field of view is so small. If you do want the images to be visible in such a case, you could instead use dome coordinates.

When playing audio or showing an image, remember that these are automatically unloaded when your script ends. So you will need to put a delay (wait command) into your script to hear audio or see an image. Also note that the default alpha (transparency) setting is invisible (0) for images, so you need to set the image alpha yourself to have a visible image (1 is fully visible).

Conclusion

Scripting is a powerful tool, but like other powerful tools, it is also can be complex to master. Please contact your system vendor or the Nightshade project if you have questions or problems.