

# Smart Dynamic Range: A Universal Pipeline Tool for Image Based Lighting

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## 1. Introduction

We present a new lighting toolkit for all major 3D applications, designed to simplify and unify the task of setting up a professional image based lighting solution.

We believe that there is a gap between the conclusions of DEBEVECS research on Image Based Lighting\*, and the usability in standard 3D applications. Some big studios managed to reach DEBEVECS threshold, and take full advantage of the potential that image based lighting offers. But they had to develop proprietary pipelines, in order to achieve a production-ready ratio of image quality and rendertime. Our toolkit emulates this pipeline, and makes it publicly available for all major 3D applications under freeware conditions.

## 2. Exposition

SDR builds upon existing HDRI technology, and its current implementation in 3D applications. By automating setup techniques that have proven successful in production, it puts all technical aspects of specific renderengines behind the curtain. The artist just selects a preset environment, and the SDR Import assistant delivers a complete lighting setup. This setup is optimized for render efficiency, quality, tweakability, as well as consistency across 3D applications.

A complete SDR environment includes:

- A low res, blurry HDRI for diffuse lighting.
- A medium res HDRI for reflection mapping (specular lighting).
- A high res camera background dome.
- A keylight for advanced shadow control.
- A thumbnail and notes for fast identification.

Also, our description file tags all HDRIs with exposure, gamma and relative offset values, as well as the type of panoramic format. The import plugins automatically take care of applying these settings.

These SDR environments can be generated by a lighting TD, saved in a watchfolder, and are instantly accessible for all import plugins in a network, of any supported host application.

SDR is designed to fit in any production pipeline. SDR Import plugins for Lightwave, 3d MAX and Maya are currently in final beta stage and will be released as freeware. Support for Cinema4D, XSI and Houdini is on our list. Also, we can present a SDR Editor prototype, that can be used to create and edit presets.

In the future, we are planning to create SDR Export plugins, that will render virtual lightprobes and turn them into SDR presets – ready for import into any other supported 3D package. This will open new opportunities for multilayered shots. For example, one could create a background scene in Lightwave and a foreground character in Maya, and via SDR the lighting is in perfect sync.



Figure 1: Three fully automatic SDR-Setups, one mouseclick apart. Shown is direct output from Lightwave3D. (left): outdoor “Backlot” environment with included Keylight, (middle): diffuse “EdenFX Office” environment, (right): diffuse outdoor “Uffizi” Probe by Paul Debevec. “DarkIII”-Character created by Eddie Robison

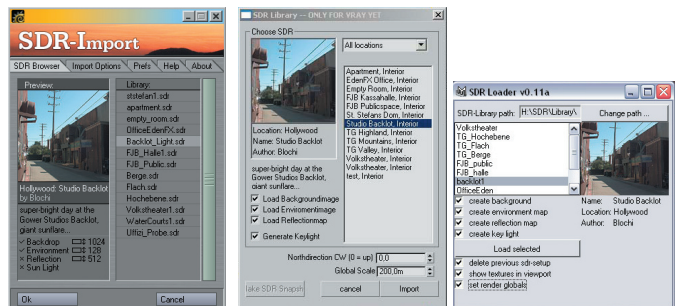


Figure 2: Artist friendly SDR Import Plugins for LightWave (left), 3d Studio MAX (middle) and Maya (right).



Figure 3: SDR Editor prototype, a tool for lighting TDs. Pictured are the 3 images that are bundled in a SDR preset.

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\* Paul DEBEVEC: Rendering Synthetic Objects Into Real Scenes: Bridging Traditional and Image-Based Graphics With Global Illumination and HDR Photography, Proceedings of SIGGRAPH 98, pp. 189-198 (July 1998).