

4.0.7.0

Milestone 4.0.7

Enhancements

- **Ray-traced BSSRDFs:** A new alternative to point-cloud subsurface scattering has been added. This method is brute-force ray-tracing based, but produces visually identical results to the pointcloud technique. This approach removes a number of shortcomings of the pointcloud method, trading them for unbiased noise instead. The new method consumes zero extra memory, supports motion blur, supports interactive relighting, is fully multi-threaded, starts up immediately and does not degrade in performance as the scattering radius shrinks. The new method is enabled by the global option: `sss_bssrdf_samples`. This option defaults to 0 for backwards compatibility (uses pointclouds). When set to a value greater than 0, this number of lighting samples (direct and indirect) will be taken to estimate lighting within a radius of the point being shaded. On top of the direct/indirect irradiance rays, the algorithm uses short probe rays of type `AI_RAY_DIFFUSE` to find points near the one being shaded, so this can bias the ray statistics in the `.log` file a bit. ([trac#2763](#))
- **Improved sampling at secondary bounces:** The 2D sampling patterns generated by Arnold will now be stratified even for secondary bounces instead of reverting to fully random sampling as before. This can greatly reduce the amount of noise, particularly when rendering things that are seen through near-specular effects like glossy reflections or refractions. ([#2371](#))
- **Improved sampling for SSS Point cloud:** When baking diffuse lighting calculations into the SSS pointcloud, we now use MIS to reduce noise from large nearby area lights and the skydome. This may increase the number of rays slightly, but give higher quality sampling in those cases. ([trac#2484](#))
- **New mesh_light:** There is a new type of light available called `mesh_light` which takes a polymesh as a parameter and emits light using the polymesh's surface geometry. Note: The mesh light's matrix transform is being ignored for the time being and only the linked mesh's transformation will be taken into account. ([#2864](#))
- **Improved smoothed normals:** The quality of the smooth shading normals stored per-vertex in triangular tessellations has been improved by adjusting the weights used to average the triangle normals around a vertex. In addition to triangle area, the weights now factor the angle between the two triangle edges containing the shared vertex. This will be most evident for coarse meshes where the face normal and the smoothed vertex normals substantially differ. ([#2923](#))
- **Mari UDIM texture tags:** The built-in image node now recognizes Mari UDIM tags in texture filenames and substitutes in the proper values. A vanilla tag, e.g. `<udidim>`, and customized dimensions, e.g. `<udidim:100>` are recognized. Please note that these will disable texture handles and may impact performance; we hope to improve this in a future release. ([#2670](#))
- **autobump shader call stats:** The number of autobump shader calls is now properly reported in the log statistics. In previous versions, this could "hide" a large number of shader evaluations, since autobump computes the bump differentials by calling the displacement shader 4 times, which can quickly become the dominant source of shader evaluations during rendering. ([#2899](#))
- **New ignore_dof global option:** Analogously to `ignore_motion_blur`, there is now an `ignore_dof` option which lets you quickly deactivate depth of field effects in the cameras that support it. This is equivalent to setting the `aperture_size` to 0 in the camera. In addition, an `-idof` command-line argument has been added to kick for convenience. ([#2947](#))
- **Find DSO procedurals with kick -nodes:** In addition to listing the dynamically-loaded shaders, `kick -nodes` now lists any geometry-generation DSO/DLL's used in procedural nodes (aka standins) that are found in `.", ARNOLD_PLUGIN_PATH` or any other searchpaths specified in the `kick` command-line via the `-l <path>` option. ([#2942](#))
- **Improved stack traces:** In the event of a crash, the stack trace (or "backtrace") is now reported in more detail, specially in debug builds for developers. Also, backtraces are now implemented in Windows for the first time. ([#2827](#), [#1739](#))

API additions

None.

Incompatible changes

None.

Bug fixes

Ticket	Summary	Component	Owner	Priority	Version	Created
#2930	support for Windows XP was accidentally broken in Arnold 4.0.6.0	arnold	oscar	blocker	4.0	4 weeks
#2627	monochrome images with alpha not read correctly	oiio	ramon	major	3.3	7 months
#2860	Free-floating mesh vertices crash subdivision	arnold	mike	major	3.3	2 months
#2904	Improve numerical precision of subdivision limit normals	arnold	thiago	major	3.3	6 weeks
#2905	Don't print escape sequences (colors) in logs if stdout is redirected	arnold	oscar	major	4.0	6 weeks
#2907	Oriented curves with identical motion keys corrupts orientations	arnold	mike	major	3.3	6 weeks
#2908	Crash with pixel-width optimization and constant radius specification	arnold	oscar	major	4.0	6 weeks
#2911	Crash when EXR/TIFF output cannot be opened in 'append' mode	arnold	ramon	major	3.3	5 weeks
#2912	Race condition in latent deferred SSS sample code causes random crashes	arnold	oscar	major	4.0	5 weeks
#2915	.ass parser reports incorrect line numbers when a string contains EOL's	arnold	angel	major	3.3	5 weeks
#2916	Arnold doesn't respond correctly to Ctrl+C events in windows	arnold	oscar	major	4.0	5 weeks
#2917	quantization artifacts in smooth edge of spot_light	arnold	oscar	major	4.0	5 weeks
#2921	AtNodeEntry counters are not always atomically changed	arnold	mike	major	3.3	5 weeks
#2925	maketx quantization errors when rescaling 8- and 16-bit images	oiio	ramon	major	3.3	4 weeks
#2938	ginstance attributes with default value are all exported to .ass	arnold	angel	major	3.3	3 weeks
#2941	write out floats using all bits of precision	arnold	thiago	major	3.3	3 weeks
#2943	fix warning when shader_searchpath points to a nonexisting path	arnold	marcos	major	3.3	2 weeks
#2948	Nodes with a "@before" link are always exported to .ass file as ginstance	arnold	angel	major	3.3	13 days
#2949	bug when tessellating a single polygon with a simulated hole	arnold	oscar	major	4.0	13 days
#2952	Fix run-time search paths hard-coded in "ai" and "kick"	arnold	oscar	major	4.0	12 days
#2960	incorrect user bounds warning when bounds are equal.	arnold	thiago	major	3.3	12 days
#2961	Crash with NaNs in displacement map	arnold	oscar	major	4.0	11 days
#2964	Missing ray type defines in Python API	arnold	angel	major	3.3	8 days
#2965	Empty error message when accessing a non-existent EXR texture	oiio	oscar	major	4.0	7 days
#2702	IOR set to 0 in the standard shader gives a fatal error	arnold	marcos	minor	3.3	5 months
#2933	improved reporting of light samples in the log file	arnold	marcos	minor	3.3	3 weeks
#2934	Recover extended OS info (compatible with windows XP)	arnold	oscar	minor	4.0	3 weeks