

3.3.13.1

Milestone 3.3.13

Enhancements

- **Binary encoding of float arrays in .ass files:** A new type of encoding is used to compress large float arrays into a more compact ASCII representation, leading to smaller files and faster load times. In addition, the new encoding has exact 32-bit precision, whereas previously we truncated and stored the floats into at most 8 ASCII digits (e.g. 1234.5678). The encoded arrays are indicated by prefixing the array type with "b64" as in the example below. By default, Arnold will write encoded .ass files, but this can be turned off with the new option `binary_ass`. (trac#2434)

```
polymesh
{
  name mymesh
  nsides 54 1 UINT 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
  4 4 4 4 4 3 3 3 3 3 3 3
  vlist 47 1 b64POINT
  LJ4iv4THCEE/NV4/lnPCvhpBkEMk10/LJ4iv2uf+kDVzHI/36OGvhkc/kD9+Fs/LGenvtmU8EDqJVo/11cGv+Ij50D1 ...
}
```

- **Statistics for largest meshes:** The triangle tessellation portion of the statistics output now includes a list of the top 5 heaviest meshes by triangle count. This can be used to quickly identify over-tesselated meshes in your scenes. (trac#2438)
- **sss_threaded_sample_distribution = false disables binning in SSS point clouds:** As a work-around that ensures that any possible banding artifacts will be removed from the blue-noise SSS distributions, the `sss_threaded_sample_distribution` will cause the renderer to avoid applying the binning multi-threading technique that was sometimes causing banding artifacts in SSS samples. This of course comes at the cost of disabling multi-threaded sample generation. (#2426)
- **utility shader can visualize sg->Ns:** We have added `ns` to the `utility.color_mode` enum to visualize `sg->Ns` (the smooth, un-bumped normal). This complements the existing `ng` and `n` modes. (trac#2425)
- **linear interpolation on curves:** The curve primitive now supports a linear interpolation type that does not require a minimum of 4 control points. Note that the curve is still rendered as a cubic curve internally, so the appearance may be slightly different compared to PRMan. (trac#2431)
- **Added raw motion vector support:** A raw parameter has been added to the `motion_vector` shader. This mode stores the raw, un-encoded motion vector directly in the RG components of the shader's output. The default value is `FALSE`. (trac#2432)
- **Added motionvector built-in AOV:** This AOV provides raw, un-encoded 2D motion vectors between shutter start and end. Note that the calculation of motion vectors is slow. To render an image with motion vectors but no 3D motion blur, you may use the `ignore_motion_blur` global option. For best results, this AOV should be filtered similarly to Z values. (trac#2433)
- **Added Pref built-in AOV:** Arnold can now output Pref coordinates (sometimes called pose reference coordinates) to an AOV, similar to the P AOV. This would only work in scenes that have been exported with Pref user-data. (trac#2435)

API additions

- **AiSSSTraceSingleScatter():** This new function gives a single scattered approximation to SSS along the ray direction. The number of samples taken to compute the result is controlled linearly by the new `GI_single_scatter_samples` render option. This function uses pretty much the same parameterization as Wann Jensen's 2001 BSSRDF paper, where the mean free path parameter can be computed for the values from the table in that paper using the following formula: $mfp = 1/\sigma_t' = 1/(\sigma_s' + \sigma_a)$. Note that the effect of this function can be disabled with the `ignore_sss` option. (#2169)
- **AI_LOG_SSS:** Added new log type `AI_LOG_SSS`, applied to SSS messages so that they are moved up to level 5 verbosity in kick. (trac#2421)

Incompatible changes

- **AiLoadPlugin():** The arguably redundant `AiLoadPlugin()` function is now deprecated. Its functionality has been added to `AiLoadPlugins()`, which can now load any combination of directories and explicit plugin files, separated by ':' in Linux/OSX or ';' in Windows. The deprecated function will be removed in the next major release. (trac#2419)

Bug fixes

Ticket	Summary	Component	Owner	Priority	Version	Created
#2391	strong bump mapping produces specular faceting artifacts	arnold	alan	critical	3.3	8 weeks
#2416	bump mapping epsilon is too big for some scenes	arnold	alan	critical	3.3	5 weeks
#2405	reduce artifacts at bin boundaries in blue noise SSS point cloud construction	arnold	oscar	major	3.3	6 weeks
#2408	reduce numerical instability in pixel-length estimate for adaptive subdivision	arnold	marcos	major	3.3	6 weeks
#2412	'#' should be allowed in quoted string attributes	arnold	ramon	major	3.3	6 weeks
#2418	Plugins with .sog extension are not automatically loaded	arnold	angel	major	3.3	5 weeks
#2422	sg->Ns should not include autobump	arnold	ramon	major	3.3	5 weeks
#2426	Fix dark lines in SSS when 'sss_threaded_sample_distribution' is false	arnold	oscar	major	3.3	5 weeks
#2428	Crash when using a shader which is not a shader	arnold	oscar	major	3.3	5 weeks
#2442	polygon_midpoint SSS skipping faces of axis aligned grids	arnold	alan	major	3.3	4 weeks

Ticket	Summary	Keywords	Component	Owner	Priority	Milestone
#2465	Node names containing spaces should be wrapped in quotes when written to .ass	3.3.13.1	arnold	angel	major	3.4
#2474	light samples sometimes traveling through solid objects	mill, 3.3.13.1	arnold	alan	major	3.4