

MARTIN SCORSESE ON TOM ROLF

# CINEMONTAGE

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# mocha Machine

## IMAGINEER SYSTEMS PERKS UP VFX WORK

by Joseph Herman

Imagineer Systems has recently released version 4 of mocha Pro, its highly regarded software for visual effects that is used by leading studios around the world. It has been used in the creation of such blockbuster motion pictures as *The Hobbit*, *Black Swan*, *The Amazing Spiderman*, the *Harry Potter* series and others. In February 2013, Imagineer was honored by the Academy of Motion Pictures Arts and Sciences with a Scientific and Technical Award for mocha's innovations, which have caused it to gain widespread adoption in the visual effects industry.

The fact that it won this prestigious award should clue you in to the fact that mocha Pro is an important and compelling piece of software with impressive capabilities — especially in the areas of rotoscoping and planar tracking (see Figure 1)...as well as a whole lot more.

Rotoscoping, of course, is the process of isolating objects in a scene over a series of frames. For example, you may wish to isolate a building in a scene to change its color. Or you might want to cut out a vehicle in order to lay it onto another background plate. Whatever the case might be, there are a million and one reasons to roto something, and it is a common task in many large productions.

However, rotoscoping can be an extremely fussy and tedious process without the right tools. Programs such as After Effects might have built-in tools that allow for the rotoscoping of objects; however, they fall far short of the roto tools found in mocha Pro.

The main reason mocha is so powerful is because it is a planar tracker as opposed to a point tracker. Planar tracking tracks the movement of planes in your scene, whether the planes are moving in two dimensions (horizontally and vertically) or in three dimensions (with perspective).

This is incredibly useful in a wide variety

of shots in which you might want to add images to television screens and computer monitors, or create those kind of slick-looking graphical interfaces that were first made popular in Steven Spielberg's 2002 film *Minority Report* and can be seen in many other movies such as the *Iron Man* series. The list of uses for planar tracking range from plastering billboards and signs to walls to placing advertisements on the sides of buses to adding logos to the front of a book.

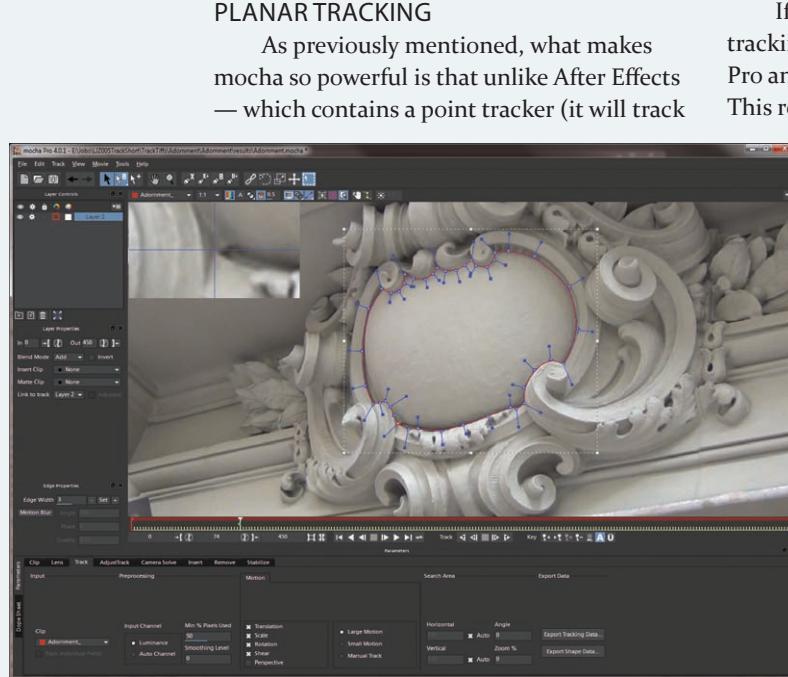
However, planar tracking is also very useful in — and complementary to — rotoscoping. You can track a plane, such as the surface of a wall, and then create roto



shapes for paintings on that wall. Next, you can link the roto shapes to the planar track, which causes them to automatically move in conjunction with the plane. If the linked roto masks happen to drift a bit during the shot, they can easily be fixed with a few judicious key frames here and there (see Figure 2).

By linking roto masks to a planar track, the process of rotoscoping becomes much easier than trying to rotoscope objects manually, frame by frame. Of course, this saves you a lot of time and frustration. If you have never used mocha before and are accustomed to doing manual roto work, once you do it this way, you'll never look back.

*Figure 1: mocha Pro 4 is a robust planar tracking and rotoscoping tool. It is also capable of many things such as object removal, camera solving stabilization and more and is an important tool for many visual effects studios.*



*Figure 2: mocha uses an X-Splines to create shapes (red line) with an innovative perpendicular control (in blue) that you can slide to sharpen or smooth out the points. There is also the option to use Bezier curves, as found in programs like Illustrator and Photoshop.*

### PLANAR TRACKING

As previously mentioned, what makes mocha so powerful is that unlike After Effects — which contains a point tracker (it will track

a single point in your shot, or two points if you are tracking rotation) — mocha is a planar tracker. What that means is that mocha Pro tracks and analyzes an area, or pattern, of pixels and derives a plane from it.

If the plane is mostly moving in two dimensions, you can tell the software to limit the track to translation, scale, rotation and shear. For more complicated tracks, including three-dimensional movements, you can add perspective.

One nice thing about tracking in mocha Pro is that you can change the tracking data as you go along. For example, let's say you are tracking the floor in a scene and at some point the part of the ground you are tracking moves out of frame. No need to start over; simply move the area you are tracking to another suitable position on the ground and continue.

When you are done with tracking and rotoscoping, you can export the tracking or shape data from mocha Pro into a variety of different programs where it can be used. These programs include Adobe After Effects, NUKE, Flame, Quantel, Fusion and Adobe Premiere Pro.

In the case of After Effects, if you export the shape data, you can simply paste it onto a layer by choosing Paste mocha Mask in the Edit menu. The result is an identical AE mask on the layer, with keys on every frame that cause it to perform precisely as it did in mocha Pro.

If you're not after the mask, but rather the tracking data, you can export it from mocha Pro and paste it onto a layer in After Effects. This results in position, scale and rotation keyframes that cause the layer to move in the same way as the tracked object.

If you'd rather render out an image sequence or QuickTime movie to be used as a matte in your compositing program, you can do that as well, and include things like motion blur and per vertex feathering.

### OTHER COMPELLING FEATURES

Another great feature in mocha Pro is the Remove Tool. This handy feature is incredibly useful for rig and wire removal, as well as removing things like imperfections, blemishes, microphones — or even

entire objects or actors. By creating a “garbage matte” around an object you want to remove, mocha will analyze the background and magically remove it from the scene. If there is not enough clean background in the shot for it to work its magic, you can provide your own clean plate for the purpose. This is an important and useful tool that can save many hours of work.

Imagineer's mocha Pro can also analyze a scene and solve for a 3D camera, which it can export to other applications such as After Effects, CINEMA 4D, NUKE, Maya and other software. The Camera Solver is a useful feature; however, such programs as After Effects, C4D and NUKE have capable motion trackers built in. But if you don't use those packages, mocha Pro's Camera Solver should be useful.

Lens distortion can sometimes present a problem when working with a scene shot with a wide lens that has caused a bulging effect in the image. The Lens Tab in mocha Pro has tools that can rectify lens distortion and straighten things out. You can also track a plane with the lens distortion as is, and export a distortion map for later use in compositing. Imagineer also provides a free lens effect plug-in for use in After Effects.

## NEW IN VERSION 4

Now let's examine some of the innovative features that are new in version 4. First, mocha Pro 4 has a new Stereoscopic 3D workflow, allowing users to analyze differences between both left and right camera streams and solve for the disparity. This can then be applied when tracking, camera solving, and using the object remove module and image stabilization. In other words, mocha Pro's planar tracker can do multi-stream image analysis, which automatically detects and keeps track of the difference between both eyes, allowing tracking and roto tasks to be done on uncorrected footage. The outcome is that a lot less manual keyframing is needed for both solving tracks and creating roto shapes on stereoscopic footage.

In the past, when working with typical stereoscopic production workflows, one would first correct the footage — such as its vertical alignment and other differences between the right and left eyes — before doing any tracking or roto work.

While mocha has always played nicely with After Effects, version 4 now also allows for the pasting of roto masks directly into Premiere Pro timelines. This is useful to isolate elements, or to selectively blur or color-correct areas in the shot. Now editors as well as visual effects artists can enjoy the benefits of mocha. Version 4 also improves QuickTime and MPEG support.

Advanced visual effects production workflows in facilities that utilize Python scripting can now more deeply integrate mocha 4 into their pipelines, thanks to newly added support for Python scripting. An example of this might be to integrate mocha Pro 4 with an asset management system or to allow technical directors to automate mocha Pro tasks. Also new in mocha Pro 4 is an improved user interface as well as high-resolution retina display support.

## MOCHA PLUS

If you are a freelance visual effects artist and might not need all the features offered by mocha Pro, Imagineer Systems has released a version of mocha just for you called mocha Plus (see Figure 3).

As you may be aware, every version of



After Effects comes with a free version of mocha called mocha AE CC, which allows for planar tracking and rotoscoping inside of After Effects. While this might do for some projects, mocha AE CC lacks many features, like advanced modules for object removal and 3D tracking. In addition, it only works with After Effects CC, so if you're using another program like NUKE, you won't be able to export the tracking and shape data to another program.

The new mocha Plus 4 is a nice option for those who want more features than mocha AE CC — yet don't need everything that mocha Pro has to offer. Like Pro, it also has powerful features such as planar tracking and roto tools, as well as professional visual effects modules like the 3D camera solver, lens correction tools and support for copying and pasting mocha roto masks directly into Premiere Pro. In addition, there are increased export options.

## CONCLUSION

If you don't already own it, mocha Pro 4 (and mocha Plus) will no doubt prove to be an important program in your visual effects pipeline and occupy a place in the go-to category of software in your toolbox. Any project that requires tracking and roto work will benefit from its advanced features and could save many hours of tedious work. If you are currently using version 3, it is a worthy upgrade.

After Effects CC users can upgrade to mocha Plus for \$195, or to mocha Pro 4 for \$795. New users can purchase mocha Pro 4 for \$1,495. More information can be found on Imagineer Systems' website: [www.imagineersystems.com/](http://www.imagineersystems.com/). **fin**

Figure 3: mocha Plus offers much of the power of mocha Pro, such as layers, planar tracking, lens tools and camera solving.