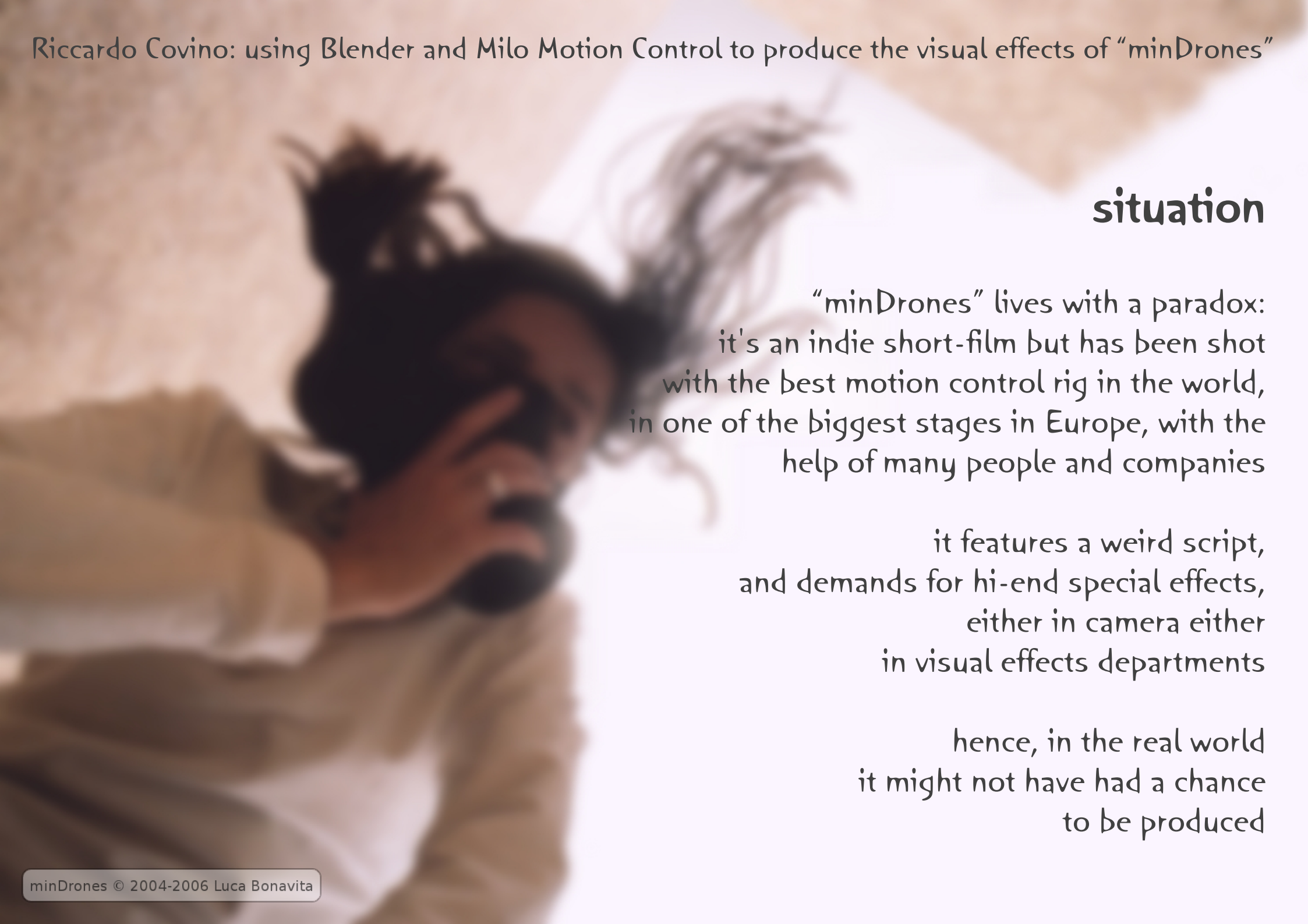
Riccardo Covino (IT) - Blender Conference – Amsterdam 2006





situation

"minDrones" lives with a paradox:
it's an indie short-film but has been shot
with the best motion control rig in the world,
in one of the biggest stages in Europe, with the
help of many people and companies

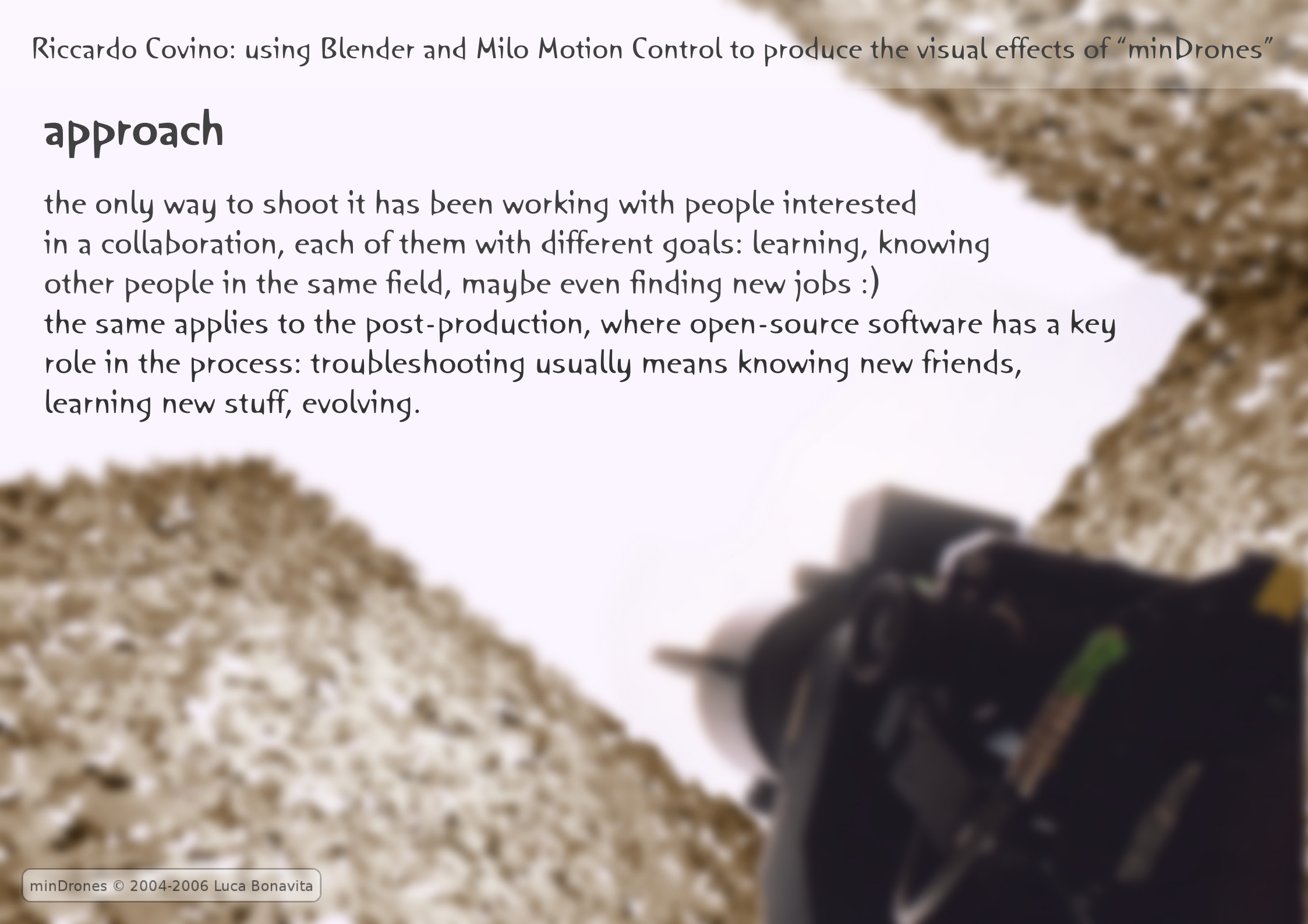
it features a weird script,
and demands for hi-end special effects,
either in camera either
in visual effects departments

hence, in the real world
it might not have had a chance
to be produced

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approach

the only way to shoot it has been working with people interested in a collaboration, each of them with different goals: learning, knowing other people in the same field, maybe even finding new jobs :)
the same applies to the post-production, where open-source software has a key role in the process: troubleshooting usually means knowing new friends, learning new stuff, evolving.



synopsis

a young mother is dying of a brain cancer, struggling for life in her very last moments

under the effect of brain damage and morphine her reality collapses

she gets literally thrown into a nightmare, where random memories merge with her visions, helping her to understand she has to go



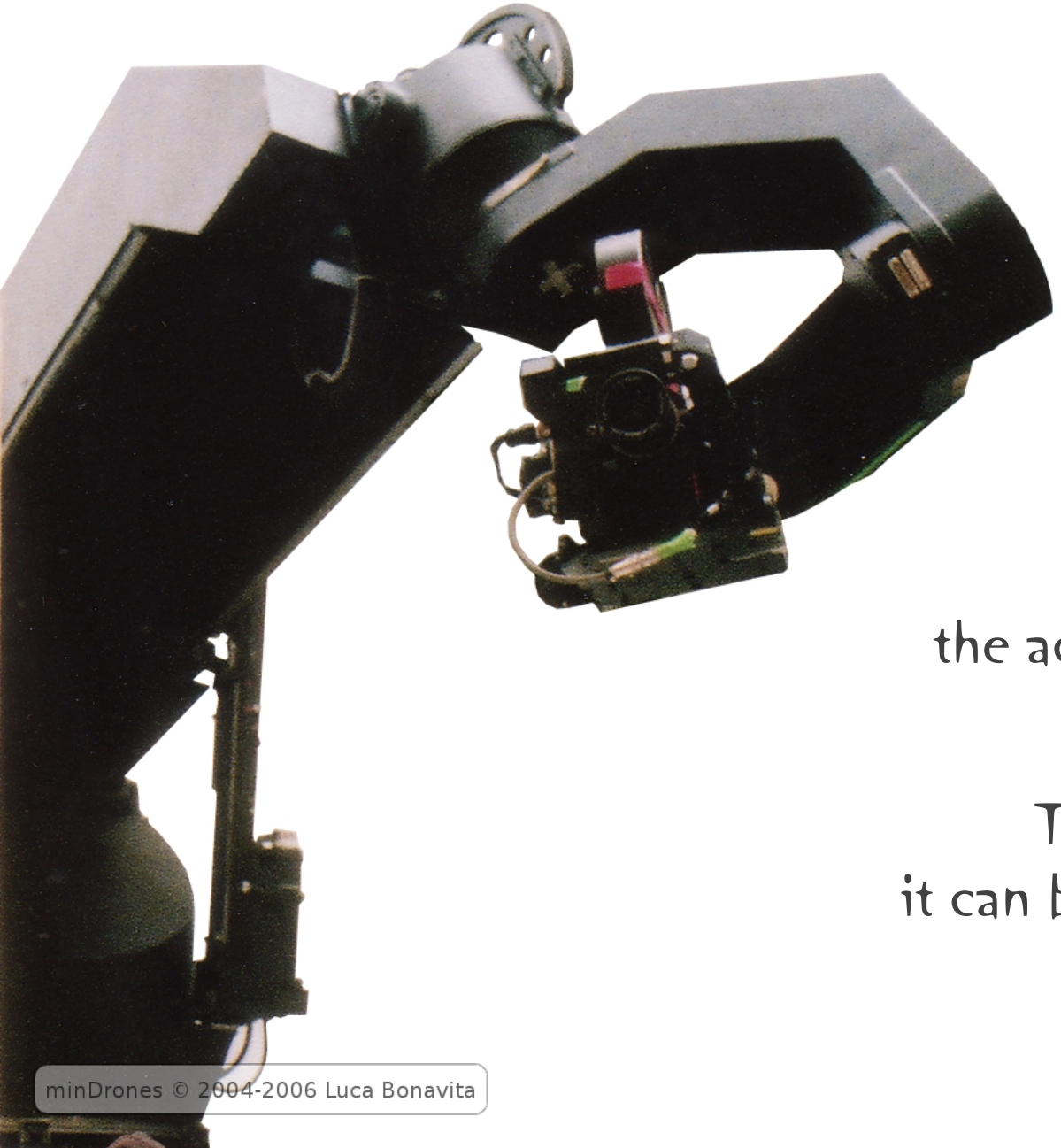
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Milo Motion control

The basic of motion control tecnique is being able to precisely control and repeat the camera moves in order to keep perspective consistency for each frame

Controlling each single phase of the shoot means having great freedom during post-processing and editing

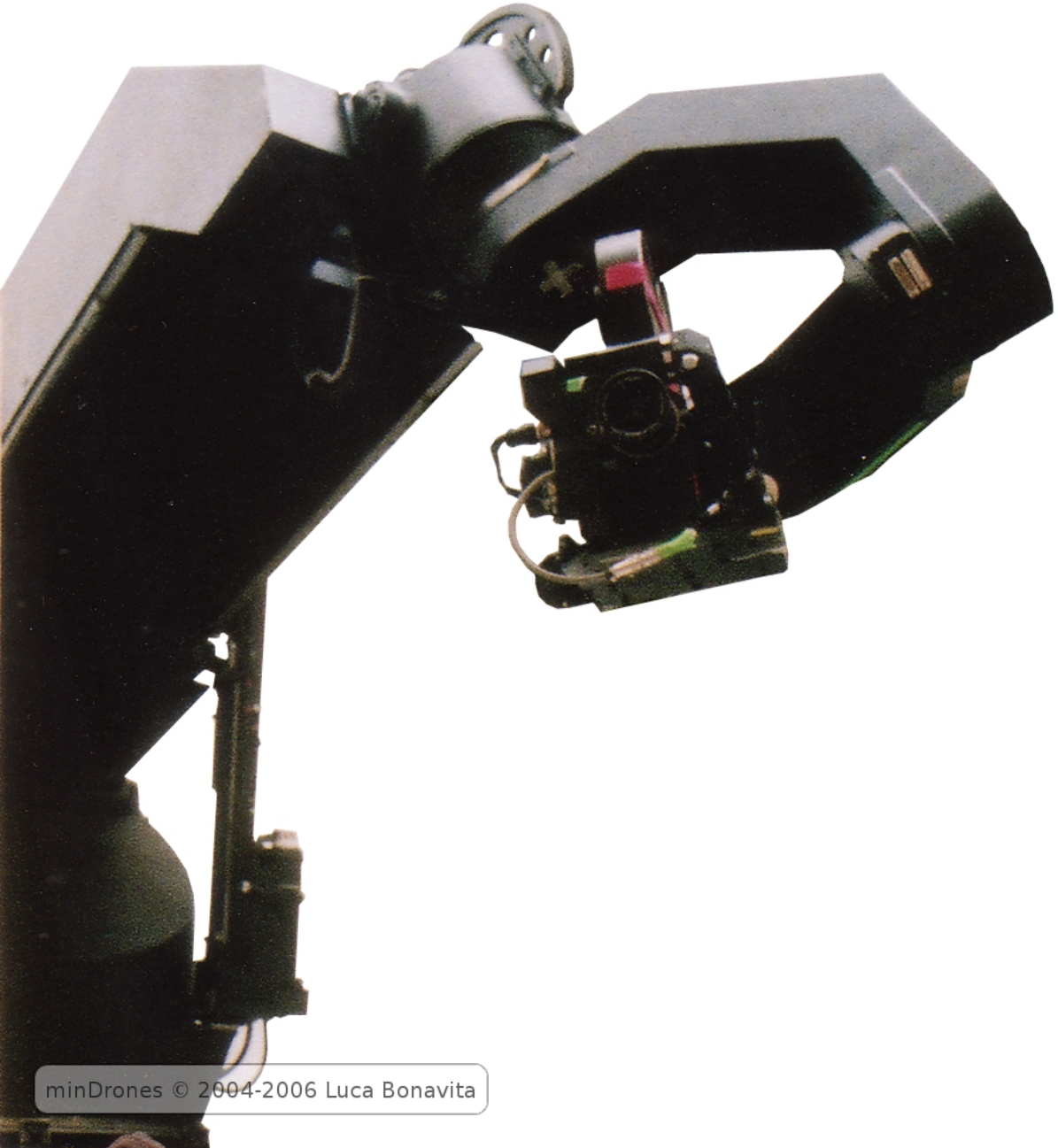


Milo Motion control

Some examples:
MULTIPASS

"Repeat" means you can
shoot the same take with
the actor in different places.
In this fashion you can duplicate
the actors, creating "impossible twins",
or repeat crowds

The same applies to the set itself:
it can be changed within the same take,
right under the viewer's eyes



Milo Motion control

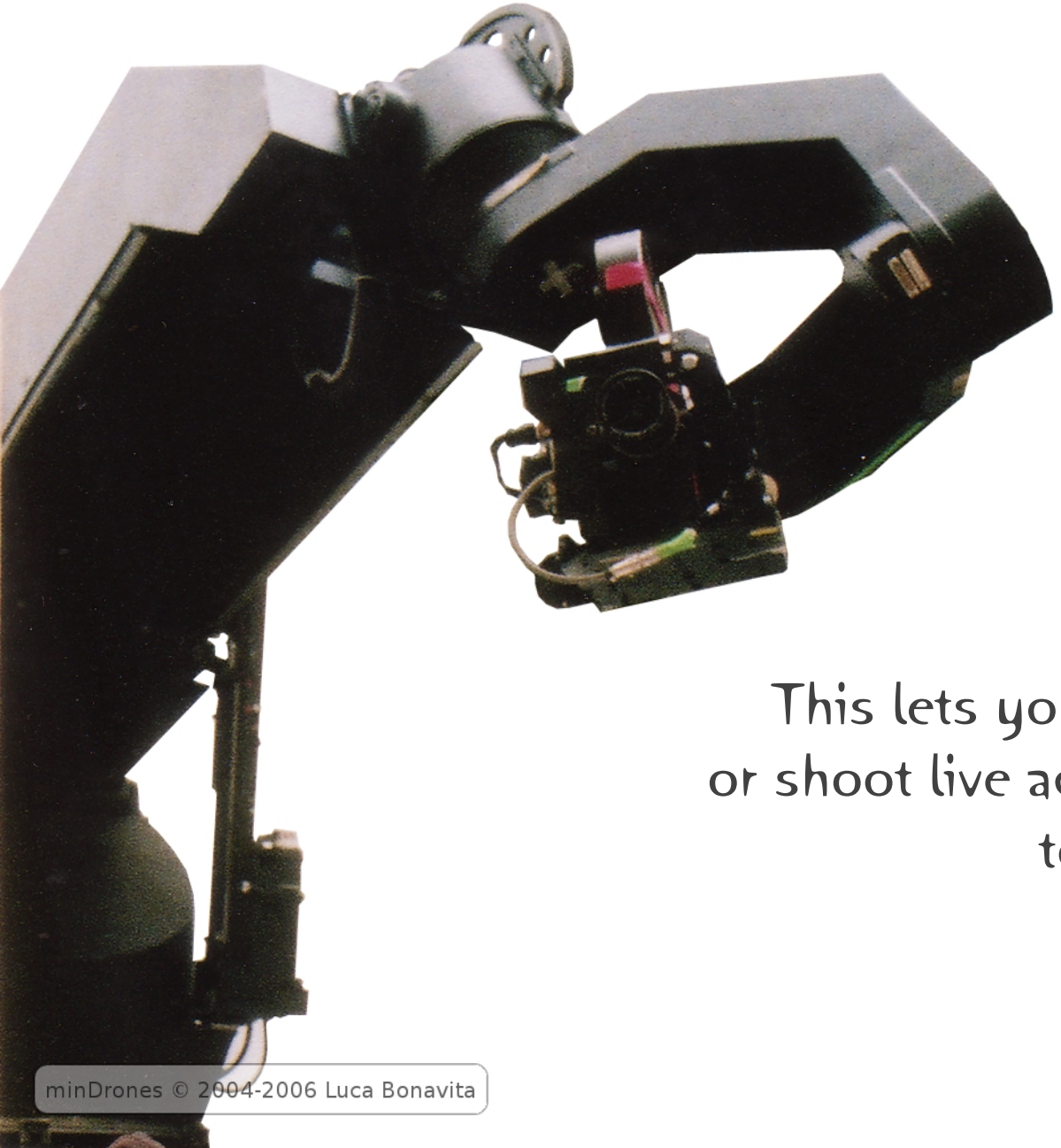
Some examples:
MULTIPASS.2

Furthermore, the Milo is portable, meaning that you can shoot different sets in different locations.

Imagine what that means: starting a camera move in Venice and finish it in Amsterdam!

Riccardo Covino: using Blender and Milo Motion Control to produce the visual effects of "minDrones"



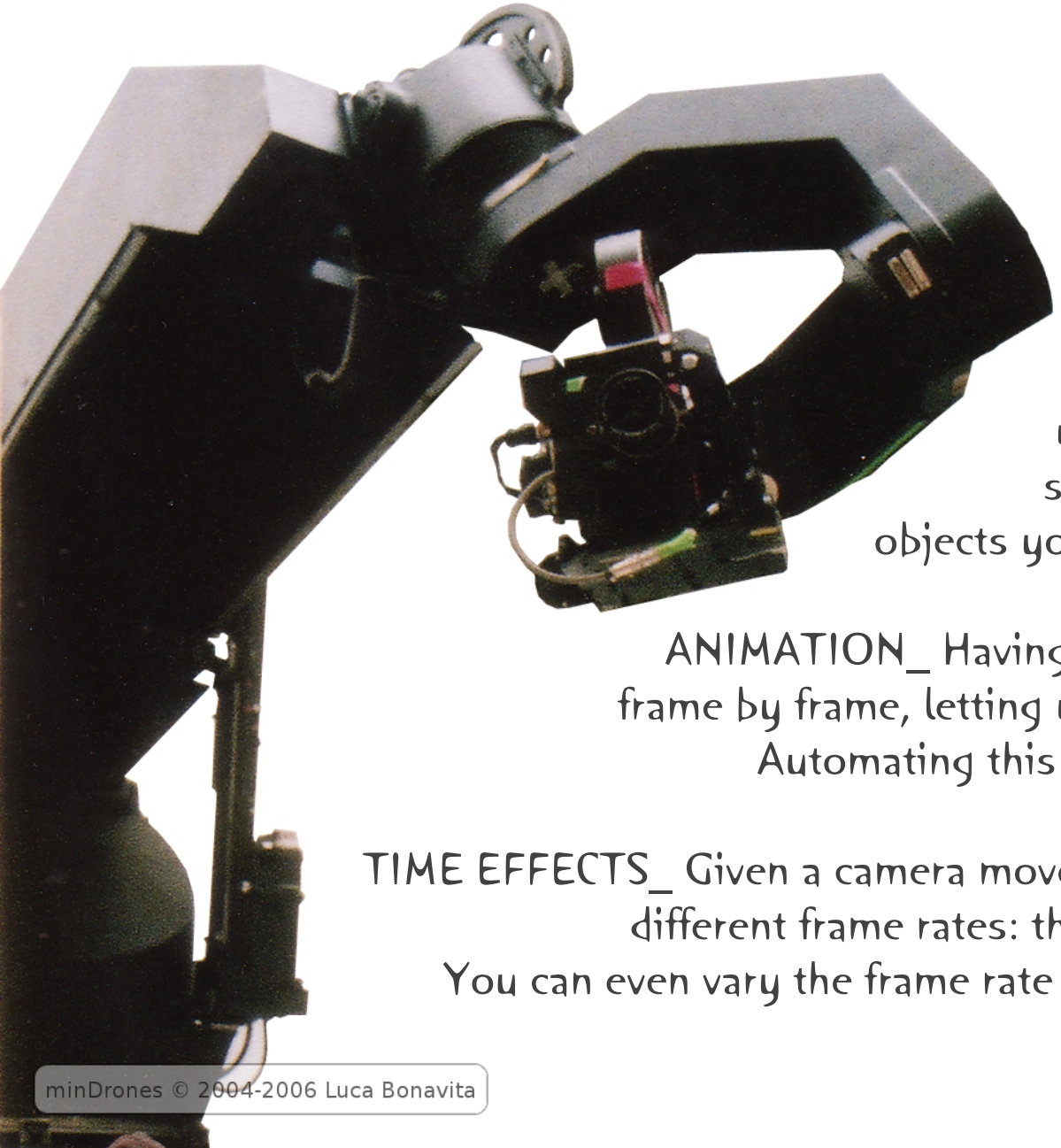


Motion control tecnique

Some examples:
CGI integration (i.e. 3D)

The Milo can move the camera on a desired path in space/time, allowing for camera data *import from* or *export to* 3D.

This lets you add 3D elements in a real scene, or shoot live action parts (e.g. humans or fluids) to be included in a 'sinthetic' scene



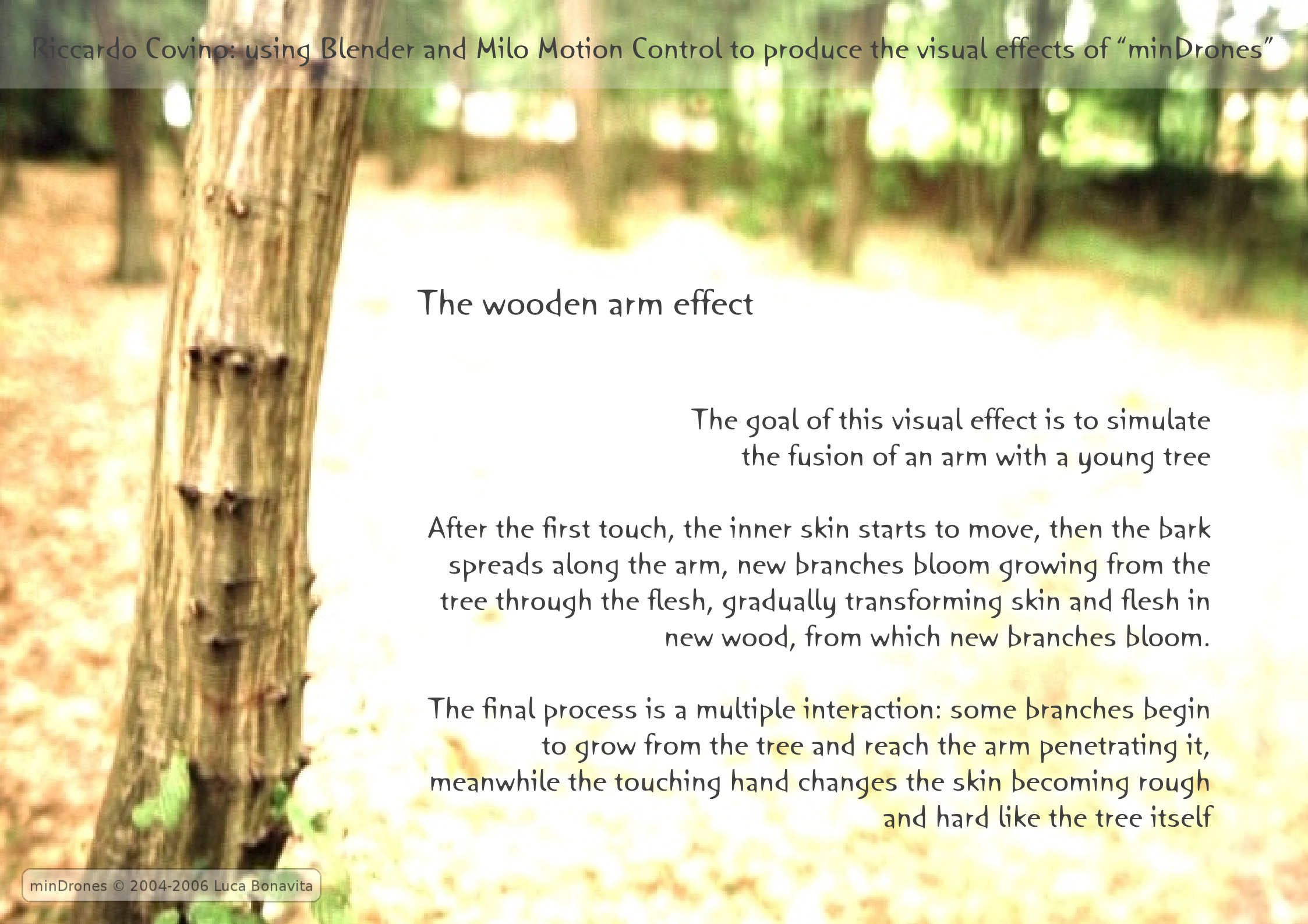
Motion control tecnique

Examples:
OTHER EFFECTS

SCALING_ You can size the camera path at your will. Having different passes of different sizes means changing the apparent size of the objects you're framing (remember "Gulliver's travel"?)

ANIMATION_ Having stored a camera move, the Milo can shoot it frame by frame, letting you to do STOP MOTION and GO MOTION. Automating this process, you can shoot TIME LAPSE effects.

TIME EFFECTS_ Given a camera move at 25 fps as a reference, you can shoot it at different frame rates: the Milo will adjust its own speed accordingly. You can even vary the frame rate within the same move: the Flair software will calculate the move for you.



The wooden arm effect

The goal of this visual effect is to simulate the fusion of an arm with a young tree

After the first touch, the inner skin starts to move, then the bark spreads along the arm, new branches bloom growing from the tree through the flesh, gradually transforming skin and flesh in new wood, from which new branches bloom.

The final process is a multiple interaction: some branches begin to grow from the tree and reach the arm penetrating it, meanwhile the touching hand changes the skin becoming rough and hard like the tree itself

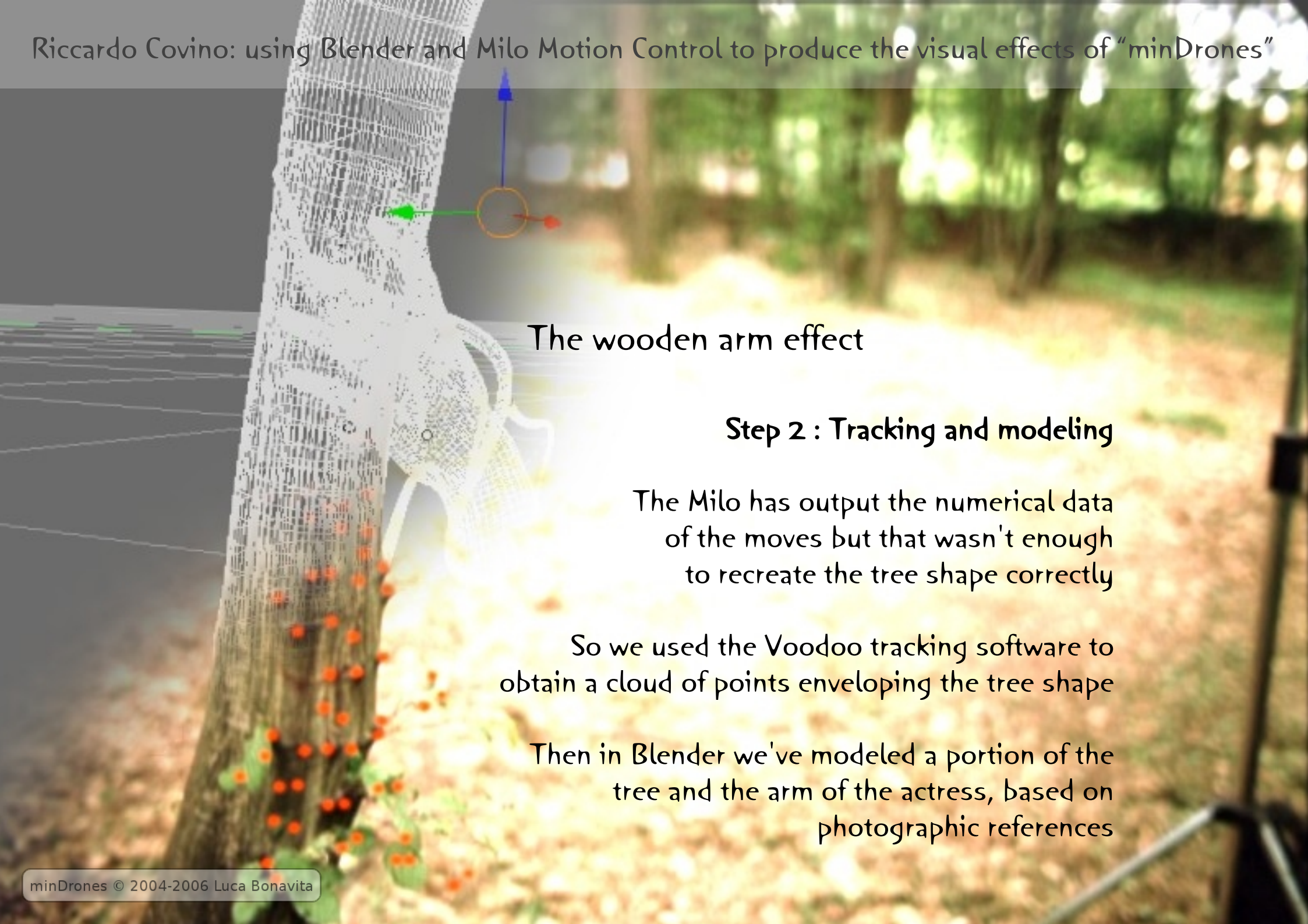
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The wooden arm effect

Step 1 : Multipass shooting

The shots of the arm touching the tree were filmed
using the multipass tecnique, in order to shoot
the same camera moves on the background
and the actress, also allowing to output the camera data



The wooden arm effect

Step 2 : Tracking and modeling

The Milo has output the numerical data of the moves but that wasn't enough to recreate the tree shape correctly

So we used the Voodoo tracking software to obtain a cloud of points enveloping the tree shape

Then in Blender we've modeled a portion of the tree and the arm of the actress, based on photographic references

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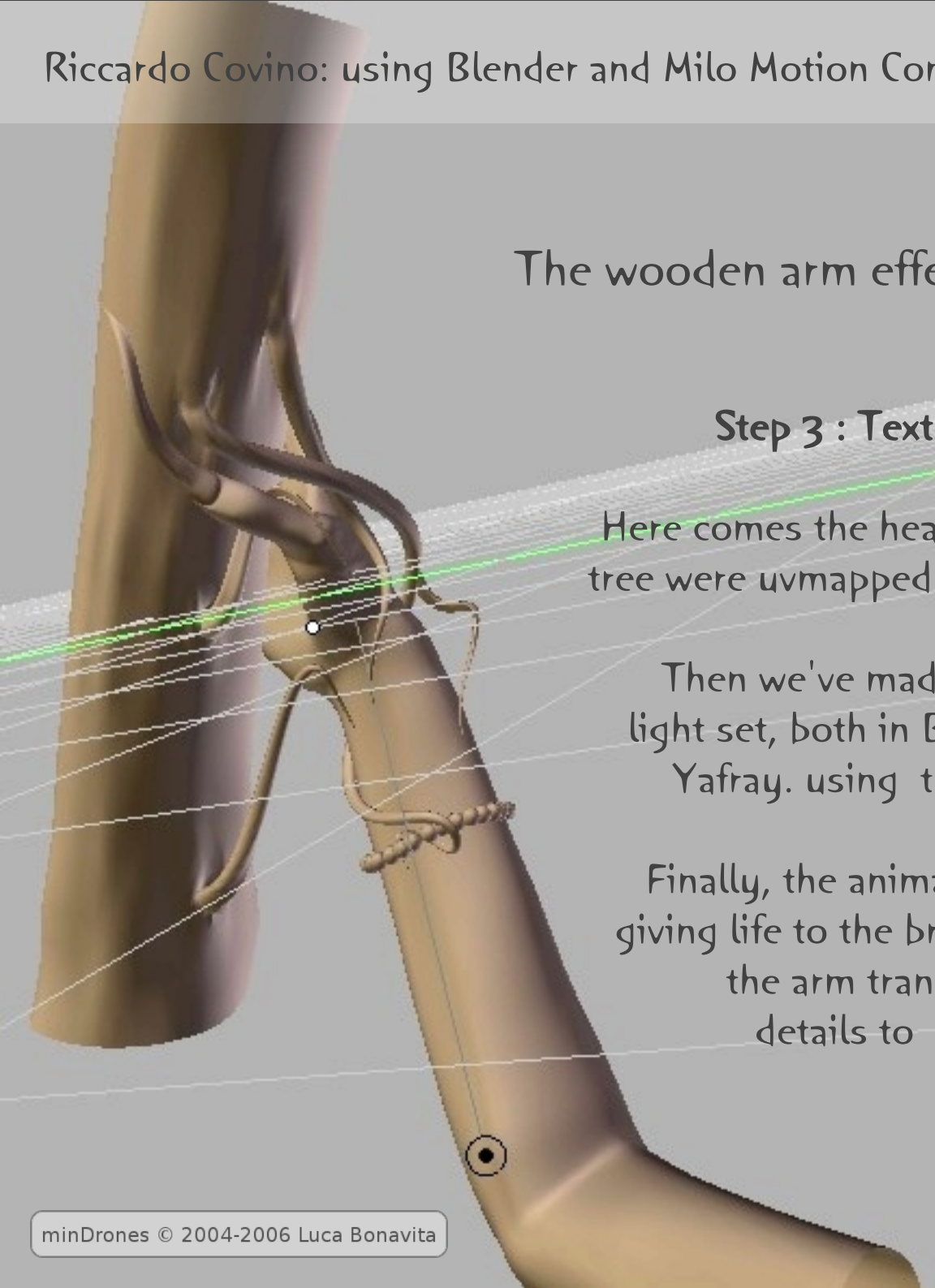
The wooden arm effect

Step 3 : Texturing, lighting and animating

Here comes the heavy work for Blender: arm and tree were uvmapped with high resolution textures

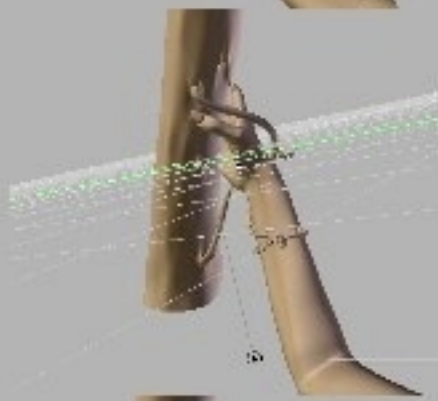
Then we've made many different tests for the light set, both in Blender internal engine and in Yafray. using traditional and HDR tecniques

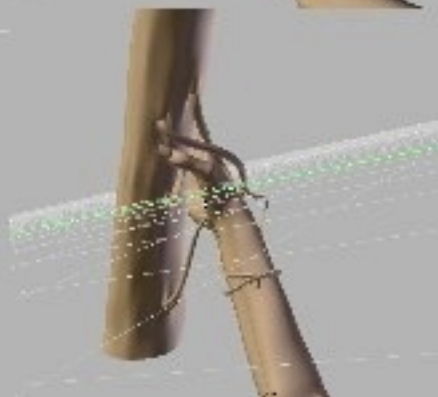
Finally, the animation process was focused on giving life to the branches, making the hand and the arm transform into bark, adding small details to give a better sense of realism



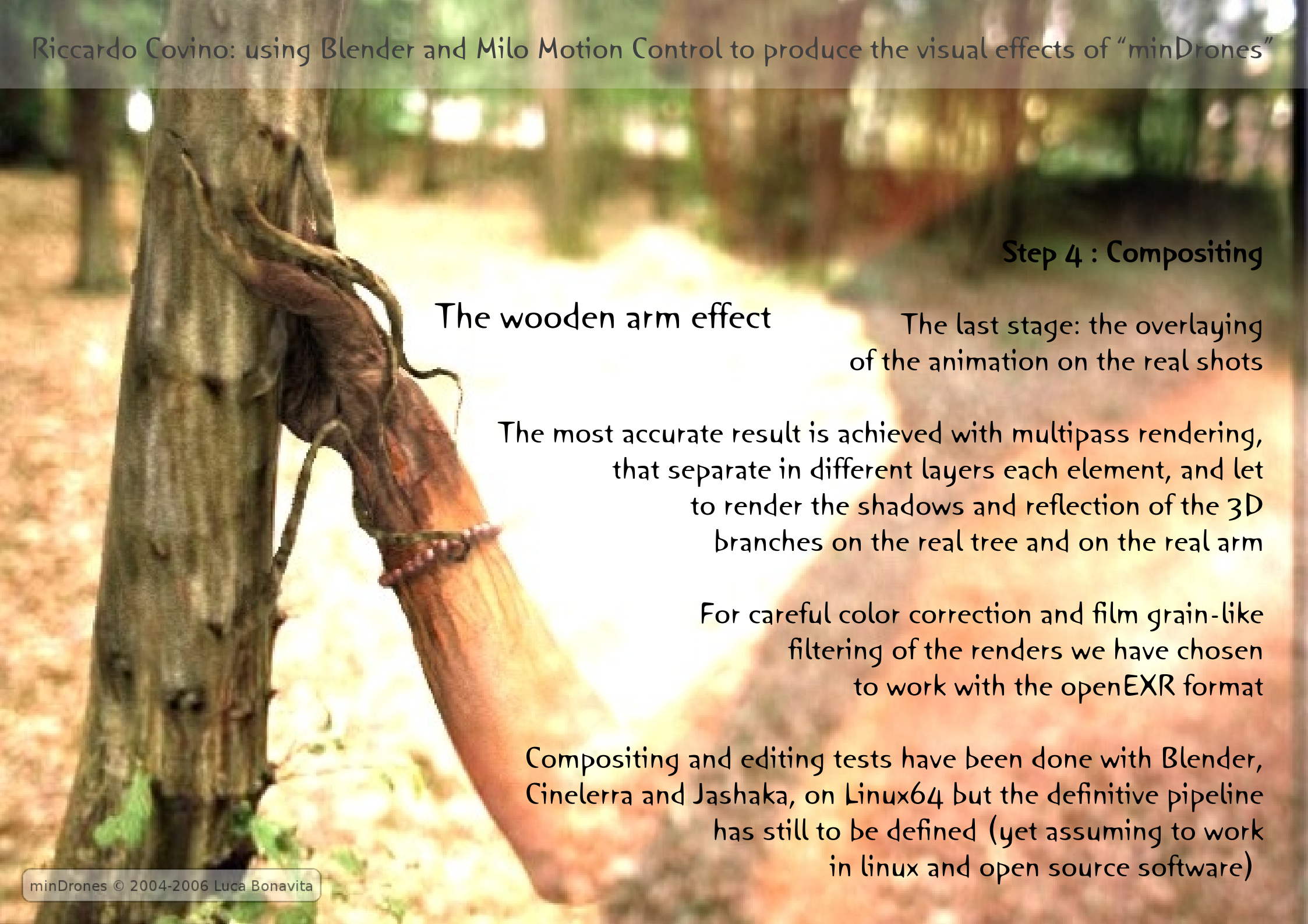








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Step 4 : Compositing

The wooden arm effect

The last stage: the overlaying of the animation on the real shots

The most accurate result is achieved with multipass rendering, that separate in different layers each element, and let to render the shadows and reflection of the 3D branches on the real tree and on the real arm

For careful color correction and film grain-like filtering of the renders we have chosen to work with the openEXR format

Compositing and editing tests have been done with Blender, Cinelerra and Jashaka, on Linux64 but the definitive pipeline has still to be defined (yet assuming to work in linux and open source software)

A realistic moth

Some shots required a moth possibly behaving like the director wanted, including transforming itself into something else

A virtual moth was clearly the only solution, but not an easy task

It had to be close to the camera, showing a high level of detail, and it had to move and react like a real one

So, before creating it, we had to read some essays regarding the anatomy and the flight dynamics of the Cossus Cossus moth, our 3D 'hero'



Cossus Cossus
Blenderus internalis enginae renderae

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A realistic moth



The Cossus Cossus moth is about 6 cm long and has sort of a brownish fur

The texturing was accomplished using photographic references and GIMP

The rigging let us to easily control the body, the legs, the head, the wings and the antennas

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A realistic moth

Another scene in early development shows a close-up of a moth trapped between the fingers of the nurse

The moth suddenly freezes and morphs into a butterfly needle, changing its shape and transforming into a plastic object

The current picture shows a preliminary modeling and compositing

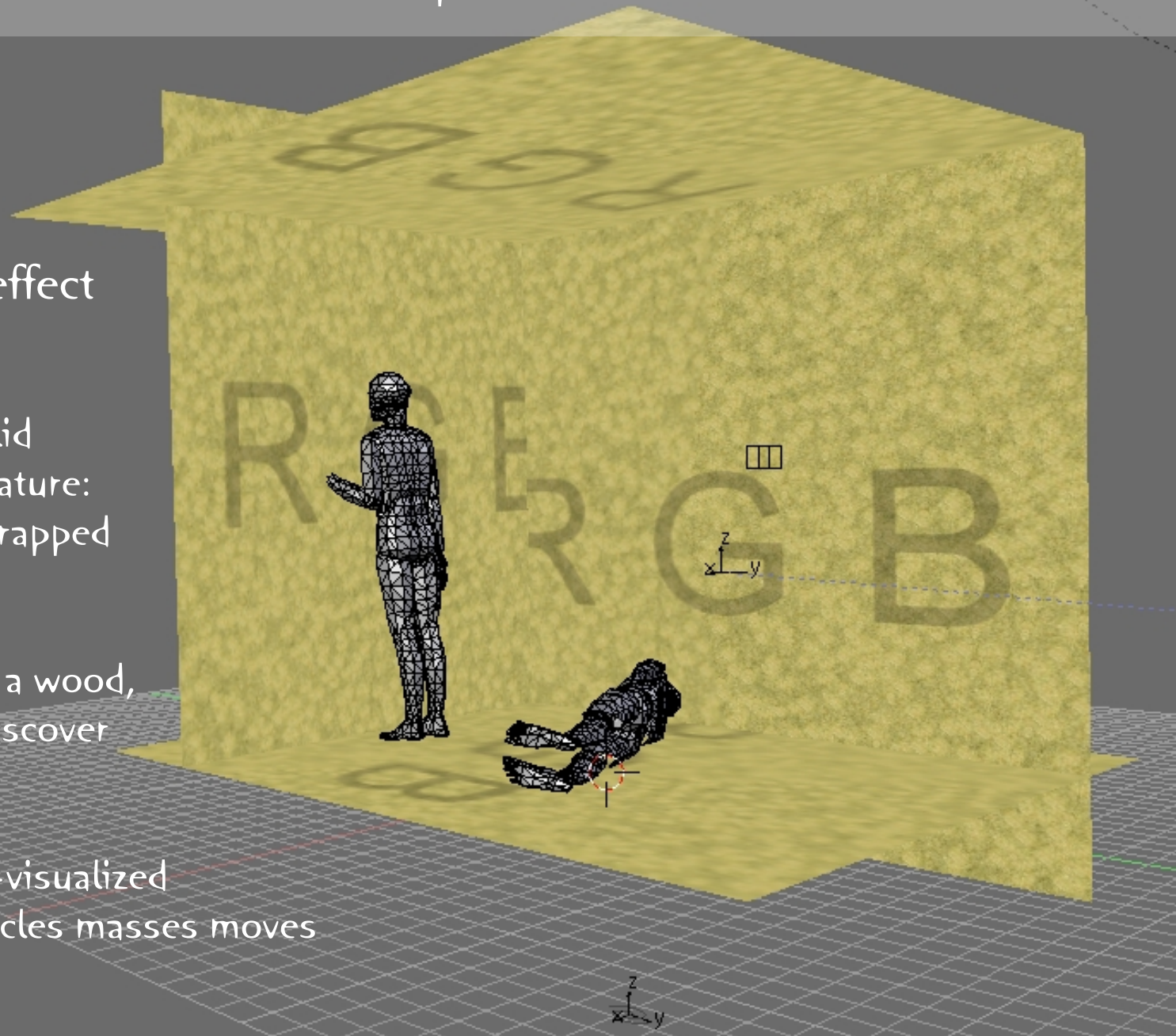
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The swarming walls visual effect

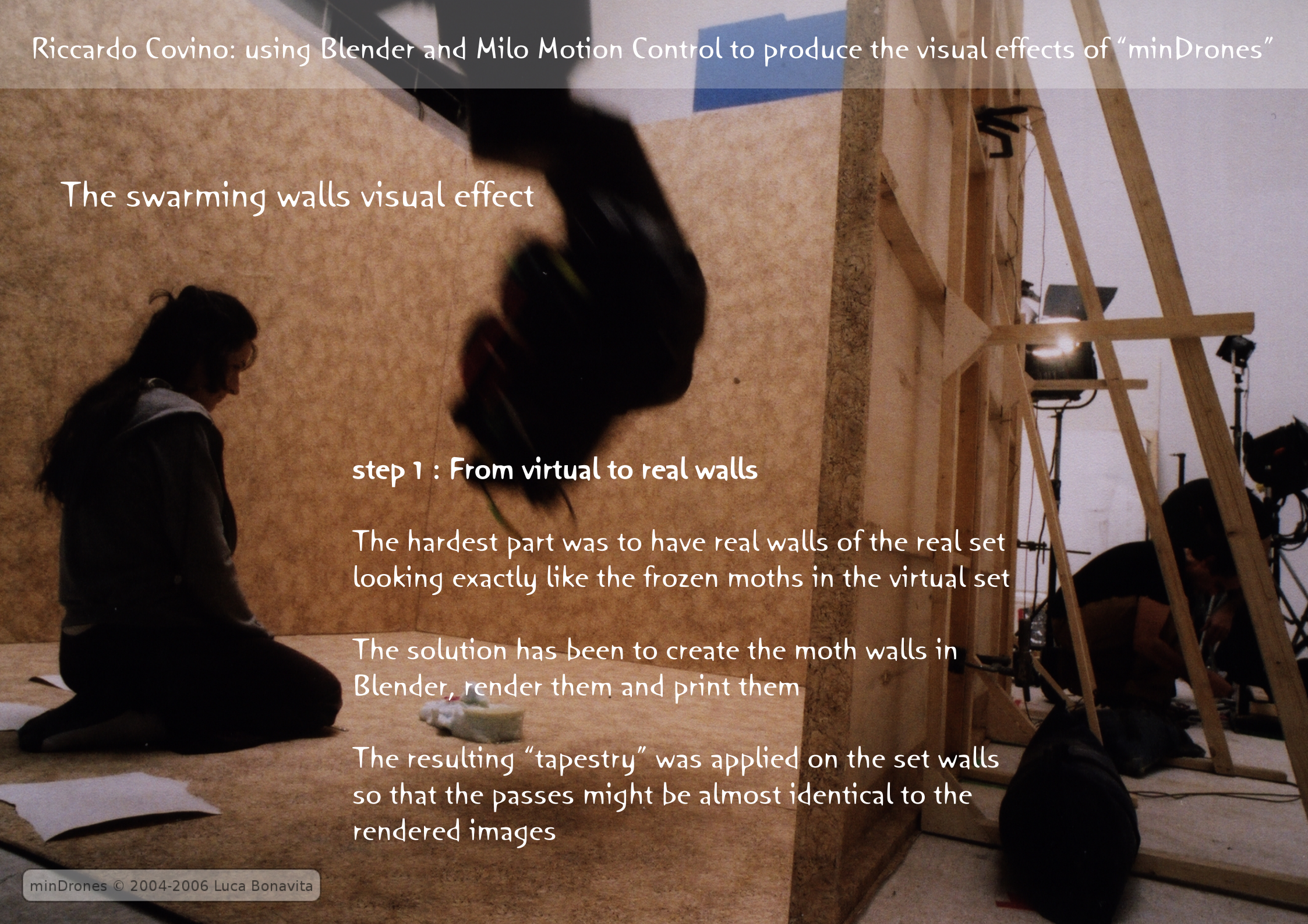
A room, apparently made of solid walls suddenly shows its real nature: a tumultuous swarm of moths trapped in a frozen moment

The swarm flies away revealing a wood, where the main character will discover a new surrounding reality

The camera move has been pre-visualized on the basis of the chosen particles masses moves



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The swarming walls visual effect

step 1 : From virtual to real walls

The hardest part was to have real walls of the real set looking exactly like the frozen moths in the virtual set

The solution has been to create the moth walls in Blender, render them and print them

The resulting "tapestry" was applied on the set walls so that the passes might be almost identical to the rendered images

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The swarming walls visual effect

step 2 : Multi-pass shooting and tracking

In the script the cell is a closed cube...

Obviously we couldn't lighten and shoot in a totally closed room, so we had to repeat part runs the same camera move, each pass moving the walls configuration (planned in the pre-visualization phase)

The Milo multi-pass was also used to have two copies of the main character, shot in different times

All the camera data has been imported via Python script in Blender and then re-inserted in the virtual set

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The swarming walls visual effect



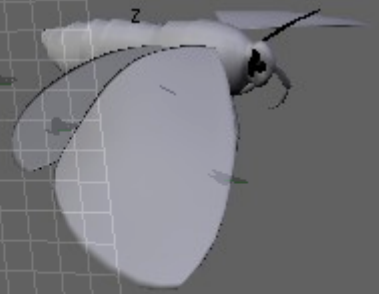
step 3 : Animating the walls

The wall moths where created using the Blender particles system, but in order to have a greater control over each one Ipo we convert them into single meshes



A mix of particles moved by fields and scripted driven shape keys produce chaotic but coherent swarms

The animation has been defined in such a way to focus the eyes on specific directions during the camera move



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The swarming walls visual effect

step 4 : Compositing

altough in an early stage, the preview of the compositing let us to verify the consistency of camera footage and Blender tracked animation

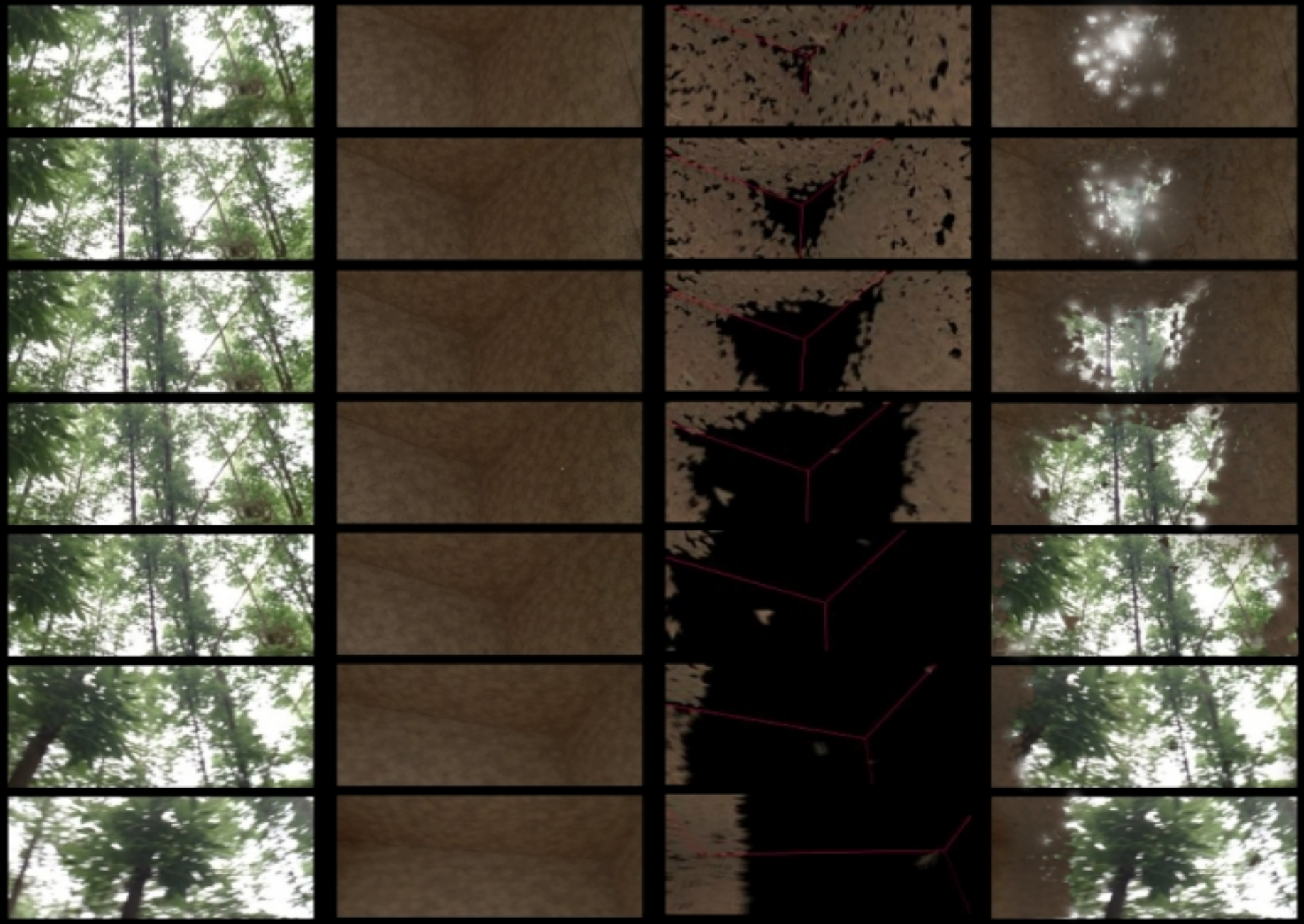
the final result will be a mix of many different layers, including different real shots and render passes

the output will (hopefully :) show a seamless integration of the effect in a unique continuos camera movement

[in figure: left wall and floor are real, right and front walls are pure Blender]

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Swarming walls: compositing preview

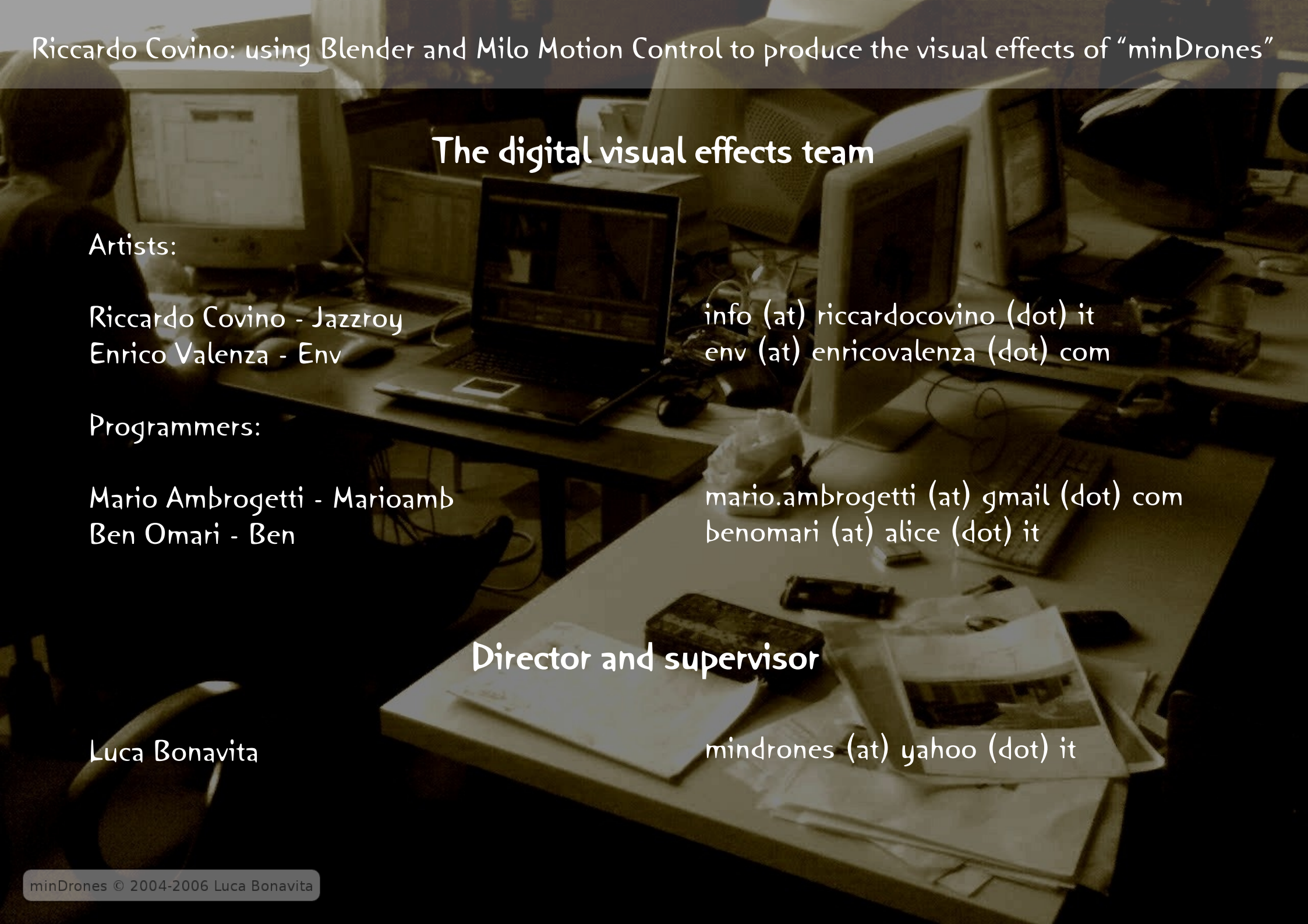
Rendering choices

Currently we've not defined an unique rendering engine for the Blender scenes

Testing by now is limited to Blender internal engine, Yafray and two Renderman compliant engines: Pixie and Aqsis

Each one has pros and cons. The internal renderer offers direct results but limited photorealism, Yafray has a good integration but long render times and some minor drawbacks, the Renderman alternatives produce excellent results thanks to the shading language but nowadays Blender integration is very poor





The digital visual effects team

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