The story of 'El Secreto de sus Ojos' (The Secrets of their Eyes) is based on a novel by Eduardo Sacheri. The story, set in 1999, is told in flashback form. A recently retired Federal Justice Agent wants to write a book about an unsolved murder committed 30 years ago in a period of time where Argentina's history was marked by violence and death. Searching for an ending to his book, this older would-be writer makes a startling discovery that compels him to redeem his past and seize his future. The director Juan Jose Campanella, depicts this with a style that effortlessly juggles romance, comedy, suspense and political commentary.

The 'Huracán' sequence was a long shot of five and a half minutes with seven hardly-discriminable camera cuts. It was the first VFX shot of its kind in Argentinean cinematographic history. It was rendered in Air 8 using the Air Stream plugin as the lighting bridge between Massive and Maya. Up to 42,000 agents were rendered in a crowded stadium with a render farm that peaked at 20 workstations as the deadline approached.

"This project is a Spanish-Argentinean co-production, like most of our Argentinean cinematography," says Marcelo Garcia, VFX Producer at Oner VFX. "The main production houses were Haddock Films, Tornasol Films, 100 Bares Producciones among others associates. At that time we were the heads of the VFX department, founded by Rodrigo S. Tomasso at 100 Bares Producciones but now we are building our own VFX boutique studio called Oner VFX."

The VFX crew were more than 20 artists and technicians but the main (in-house) VFX core team were only ten. All of them lead by Rodrigo S. Tomasso (VFX Designer/Supervisor) and Marcelo G. Garcia (VFX Producer)."This team did more than 108 VFX shots including the extended chase sequence of five minutes an a half with a crowded stadium made with Massive Software, Maya, Air Render and Nuke," explains Marcelo, "As VFX supervisor I spent almost eleven months from pre-production until final delivery. The main VFX team spent between seven to nine months."
This extended chase sequence was a real challenge for the very young Argentinean VFX company. "Nobody had done anything like this before, so everything was new," says Marcelo. "If you take into account the budget we had, the number of crew we worked with and the pre-production time of just over two months. It was difficult, not just from the VFX design point of view but also we implemented a huge amount of new technology which forced us to scale-up our architecture as well as finding the qualified people to do the work." It was the second film ever, to be shot on the RED One camera in Argentina but it was the first of its kind to introduce visual effects at this level. The 'Huracan' Sequence was done at 4K footage and delivered in 2K. The 4K resolution was helpful to work in our camera blends.

**ROTSOCOPE**

Rotoscoping was a well-known challenge but there were others like match-moving, lighting and managing the Massive pipelines. "Another was trying to make sure that our Massive simulations don't jump or fade away between each camera blend," adds Marcelo. "So we have to look into other solutions with off-setting techniques. Moreover, we had to implement Massive software in production without having enough time of study this wonderful tool." Matchmoving was definitely one of the hardest parts of the whole movie production. There was a lot of experience and good eyes involved to get the work well done.

The Lighting pipeline was only possible thanks to Hai Nguyen who offered his development of AIRStream, which is more than a simple RIB connector between Massive and Maya. Have a look at the link at the bottom of the story. He also helped 100 Bares Producciones to reduce their rendering time dramatically. They used a renderfarm of 42 cores and the power of their own 20 workstations at the same time as they were working on them.

"I don't think it is the correct way to work," adds Garcia, "but we needed to go that way to meet our deadline."

The fully extended sequence was made up of eight different moments (over many shooting days). "We start with an aerial shot, using a HotHead camera mount on an helicopter," explains Garcia. "After a full CG moment, we continue with a crane mounted camera until the end of the 270 degree camera pan. This blends into an camera over shoulder that follows the scene among the people on the stands. We have Massive agents (there were only eight real people running in the soccer field), cloth and fluids (clouds) simulations, some
3D arms and hands with fabrics on them as well as the soccer ball (after the kick), digital camera flashes, lights and advertisements removed digitally as well as some digital make up to erase the shadow of the crane over the faces of the main actors.

We actually blended several camera moments by simply memorizing and copying the last pan movement of the previous shot. We took exhaustive notes of every starting and ending point of the camera. We did retiming processes during the overlapping material and blended them out through masks (kind of short wipes). Matchmoving fixes were made also during the compositing stage.

Once we are in the internal corridor of the stadium we made other camera blends. At some points we had to re-built part of the interior structure of the stadium (floor, roof, walls, etc.) even the body of the characters, in spite of re-framing and re-scaled some footage. We made some retiming processes and composite in the little fight scene inside bathroom and finally we rebuilt with camera mapping techniques the moment were the actor fall four meters through an external corridor moments before to be captured by the police out on the field."

"El secreto de sus ojos" Image courtesy of 100 Barros Producciones
The drop from the stadium halls to the laneway, is one of the crew's favorite. "We made the camera go to the other side of the wall, with a cut right after the camera shows the external corridor meters below. This cut was necessary to tie our cameraman and actor in a harness for the next shot.

So, straight after that, there was a kind of external platform where the cameraman walked through a moment before jumping with the actor. All the platform, the ground protection and the wires were digitally removed. We also made some kind of amazing synchronization. We tried to make the policemen get closer to the villian before he fell down. We also reduced the length of the moment were the actor is hanging off the wall. Everything was possible through rotoscoping, tracking and using patches of texture in post. Once the actor and camera are at ground level, we begin the lane way sequence. There was a lot of detail to rotoscope and matchmove by hand! The last camera blend is done when the camera tilts up showing the policemen above.
OTHER CHALLENGES

The 100 Bares Producciones crew didn't have the time to try much more because every aspect of the VFX production was new and equally important. "Some of our challenges were obtaining enough Massive knowledge, some painful matchmoving, learning camera blending solutions, offsetting simulations, editing RIB structures, bucking and managing people, changing the OS mid-production and rebuilding infra-structure of the storage system," lists Garcia. "Also changing the compositing software to make it capable of processing the 4K footage faster than others. There was certainly a lot to learn during the production."

Marcelo Garcia confides that everything else was actually just studied and picked up. At the pre-production stage the crew made animatics, some technical VFX tests to see how they could blend two different types of camera motion. "We studied the math behind the RED One's CMOS dimensions and its translation inside Maya film back and so on.

We never dismissed a solution that we'd developed before, even for an unrelated problem," explains Garcia. "I think it was one of the first times that an Argentinean production allowed the figure of a VFX supervisor the freedom to develop and technically test his knowledge in the right way. I was convinced of the script as soon as I'd read it and this is a good signal for any production with VFX like we did."

MATCH-MOVING

In crowded stands, there was a hand-held camera with more than 70% of the frame covered by moving people. Add to that 16mm lenses, lot of motion blur and a rolling shutter! One can imagine that it was really hard to track, moreover, to align geometry in the three dimensional space. Closely after we finished, new updates in matchmoving packages showed up, like the camera witness-helper.

"Basically we tried to get the best solving camera we could. Sometimes we use different solving processes to achieve a better solution and then we mixed the different solving of a
single shot into the one camera view. By the way, we made every matchmove for every take/shot. We imported the shots into Maya and started to align geometry. We used deformation of geometry a lot, but not animated. To compensate the rolling shutter issue we used a lot of spline warps in Nuke. After that there were several filtering process during compositing stage.

In the ‘drop’ sequence, they used six cameras solving despite of the motion blur and the lack of details to track. Later on, a unique camera movement inside Maya was built. All the unions between solving were hand-made (matchmoved) and we also made some fixes over the solving too. "We had just two matchmovers to match all these devilish camera movements," Marcelo points out.

ONER VFX

Oner VFX is the new VFX boutique created by Rodrigo Tomasso and Marcelo Garcia after the production of ‘El Secreto de sus ojos’. "We can supply premium visual effects for motion pictures, television shows, mini-series as well as commercials" explains Garcia. "We focus on VFX design and production, giving special attention to compositing/integration works. We like to merge different tools and disciplines to achieve our goal and the client's aim. We have worked to U.S. and Europe markets. Some of our clients are small VFX facilities from L.A. as well as some film & television producers from N.Y., Miami and Spain."
At the moment Oner VFX have three international movies in budgeting stage with crowd-based VFX since they made this extended shot and it was shown in the world. "So we are really excited about the new challenges and the expansion that our hard work achieved," he says.