

PROJECT NAME	Formula One CE	EDITING	Sony's Studio L'pool	CASE STUDY FILE
ACQUISITION	Digital Stills/MOCO	DI & FX	Sony's Studio L'pool	
SCANNING	XYZRGB's 3D Dept.	DISTRIBUTION	PlayStation 3 / others	

FORMULA ONE CHAMPIONSHIP EDITION

A PlayStation 3 Game That Uses 4K Production Techniques Seen In The Matrix & King Kong Films

www.scee.com

Sony's Studio Liverpool (formerly Psygnosis) has made racing games its speciality. Wipeout (1995) featured futuristic anti-gravity racing developed first for the PC then Playstation while Formula One 2001 was the first in a series of official Grand Prix console game for the sport's governing body FIA.

F1-06 was released on the PS2 last year but since then the Studio has been busy readying Formula One Championship Edition, a flagship title designed to showcase both the 2005-6 F1 season and PS3 production values. It's also the last year of the current contract with Bernie Ecclestone; "We're hoping to achieve a visual benchmark," says game director Graeme Ankers.

www.ebu.ch/en/technical/trev/trev_301-editorial.html

"Traditionally racing sim games have a very high entry level for users so we've spent time making F1-CE accessible while maintaining that official realistic look," says Clemens Wangerin who runs the studio. "When we started a year ago we had very early developer kits. When you're trying to write software for hardware that isn't locked down it brings with it a whole different set of challenges."

MULTI-PLATFORM RELEASE

The annual development cycle was already exceedingly tight but the studio's deadlines were stretched further by simultaneously creating versions for PS2, PSP and PS3 platforms.

"It helped that we'd completed previous F1 games so there was a certain mindset we got into right from the start," Wangerin adds. "A lot of things are already defined because the game is based on the sport. You know what tracks, cars and teams to feature; the rules are the exact rules of the real race."

While attempting to replicate the F1 world as realistically as possible the developer's trick is to create an entertainment rather than a simulation. Although it uses some basic assets from the PS2 iteration, F1-CE isn't a 'port' but an entirely new game with shaders, a physics system and dynamics algorithms rewritten to cope with the PS3 spec.

"A big part of the PS3 version is showing off what the hardware can do," Wangerin adds. "A lot of third party developers don't have the incentive or resources to do that. Sony has 1000 internal developers working on flagship titles that clearly show the difference between PS3 and anything available on the competition." Sony Liverpool's development team was hiked from 15 to 25 with a further 30 coders working in Cambridge and London.

F1-CE's 'raison d'etre' is authenticity – the developers have unprecedented access to F1's assets. The FIA are concerned it reflects their sport correctly; the sponsors want to ensure they receive the same coverage as on the circuit; and fans of the franchise expect a high level of detail. "There's quite a lengthy process of approval before we can put a track in the game," says Ankers. "We have to feature 22 cars, running their own AI, on the circuit at any one time. That's unique and a real feat

³Specular reflection is the perfect, mirror-like reflection of light from a surface, in which light from a single incoming direction is reflected into a single outgoing direction.

www.xyzrgb.com/html/whitepaper.html

of engineering." So lifelike are the circuits (viewed in multiple camera angles to mimic the broadcast TV coverage) that Jenson Button and Jacques Villeneuve have test driven new tracks on previous F1 games before experiencing them for real.

The 18 track designs are lifted directly from the architect's plans. On top of them are laid topographical information (trees, buildings or track layout) then alterations in signage, pit lane, garage and paddock. Hundreds of hi-res stills of the cars and tracks from every angle are exclusively provided. "The stills have always been at a far higher resolution than we'd been able to use – until now," says lead artist Neil Thompson. "We ask them to take close-ups of paintwork or tarmac usually from above since it's easy to texture map from flat images."

F1-CE is developed for 720p² with 5.1 straight out of the box. "Visually the main thing that lets games down is being able to see pixels on the screen," says Thompson. "As soon as you can tell it's generated the illusion falls apart."

Artists, he says, don't develop for a resolution. "Technically you do in terms of shader complexity but we think in terms of pixels on a texture. If I have a texture that's 512 pixels square and laid it flat out on a 720p screen it may obscure half the screen and you'd see the pixilation. But if I wrap that around a building that you only see a small part of then you won't see the pixels but I'd still be using a high-res texture."

"For F1-CE I wanted more than a base level grey for the tarmac. I want to show surface detail so I'll add a specular³ map to provide reflection. That eats away at your graphics memory for other resources like game AI but these decisions have to be made and adhered to early on."

BETTER GAME DYNAMICS

The new physics engine provides for a collision model which accurately simulates crash damage. "Previously the effect was rather box-like," observes Ankers. "Now the geometry allows us to feature greater drag and dynamics like slipstreaming. On impact the car will split according to what would have happened. Each part of the car has its own properties, velocity, even audio so you'll get shards of bouncing metal. That's been one of the most difficult aspects to achieve."

Canadian imaging specialists XYZRGB⁴ scanned each driver with a laser to produce 4K maps of 3D data – the same technique used in scenes for The Matrix and King Kong. "We had to animate the driver's mouths and eyes (closed during the scan) and make them move believably," says Thompson. "We've never handled so much scanned data before."

The artists have had to rethink the way they approach texture. "People weren't used to having more than one layer of texture on an object," says Thompson. "We're now dealing with normal maps and specular maps – techniques which we understood before but didn't know how to generate because there was no need to."

The cars and driver's helmets are fully reflective of themselves

and objects around them. The steering wheel is normal mapped so that its buttons are properly defined with complex LED readouts. You can get close to the tarmac and the illusion isn't broken.

"We're using high dynamic range lighting rather than traditional point lighting so that when you go into shadows your eyes compensate for the lower light levels," Thompson explains. "Effectively this means you work with a far broader colour palette."

THE LIGHT PLEASURE

Players can take the car out on a test session. Thompson chose to set this at dawn so he could create more elaborate skies with the sun low to the horizon and light reflected through trees. In other modes the game can be played in extreme wet weather where rain particle generation comes into its own.

"Lighting a track is a pleasure," he declares. "If I can communicate the parameters I want for a scene to a programmer they can give me back a user interface which allows me to play



PlayStation 3 has had a rough launch with not many games. Will F1 Championship Edition help sales?

with all kinds of effects."

Most of Sony Liverpool's artists come from cinematic rather than traditional art backgrounds. "Their primary source of information isn't sculpture or drawing but film. They naturally understand lighting, not in a formal sense, but just by growing up with cinema and observing it." penningtonadrian@hotmail.com



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