SiliconGraphics
Computer Systems

Onyx at Spectrum Holobyte
Interactive Entertainment /Virtual Reality

Spectrum Holobyte: Immersive Interactive Virtual Reality Games

Times are changing in the out-of-home entertainment industry. Traditionally, every new ride has been an engineering marvel and a major capital investment. Virtual Reality (VR) has begun to change that. Exhilarating, gut-wrenching experiences in "virtual worlds" are attracting a growing crowd of interactive game-players to mall-based digital theme parks. Spectrum Holobyte, a dynamic California software developer, an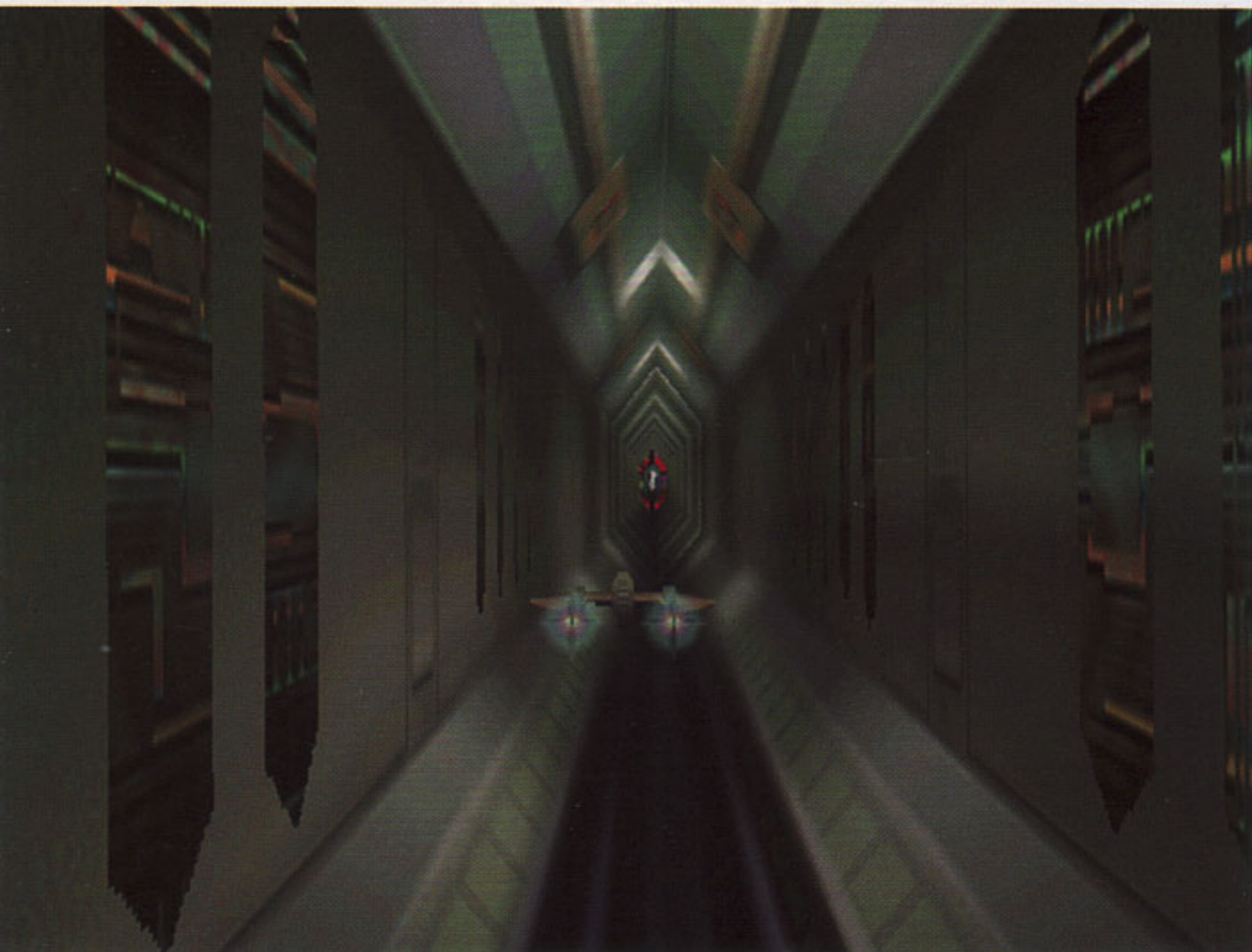d Silicon Graphics Onyx™ RealityEngine²™ graphics supercomputers are at the leading edge of this new entertainment experience.

Spectrum Holobyte is a world leader in the production of innovative video games. The company recently grew from 90 to 160 employees in a year, and is doubling staff through an acquisition. Armed with two Onyx RealityEngine² systems, Spectrum is taking its highly creative style into interactive rides for amusement parks, location-based entertainment facilities, feature ride films, and a new home video platform.

ONYX

In digital theme parks, teams of players compete in Spectrum's interactive fantasy games that include motion simulation, helmet-mounted displays, and other VR experiences.

Spectrum's VR Group is using Silicon Graphics Onyx systems —a two-CPU and four-CPU system with an additional Raster Manager each —to develop Location-based Entertainment (LBE) for digital theme parks. Their product uses distributed network simulations to generate a high-quality interactive VR experience for teams of many players. It runs on flat screens, projection screens, or head-mounted or other stereoscopic displays. The smooth, detailed look of VR games developed and run on Onyx is now being field tested in a mall-based environment in St. Louis.
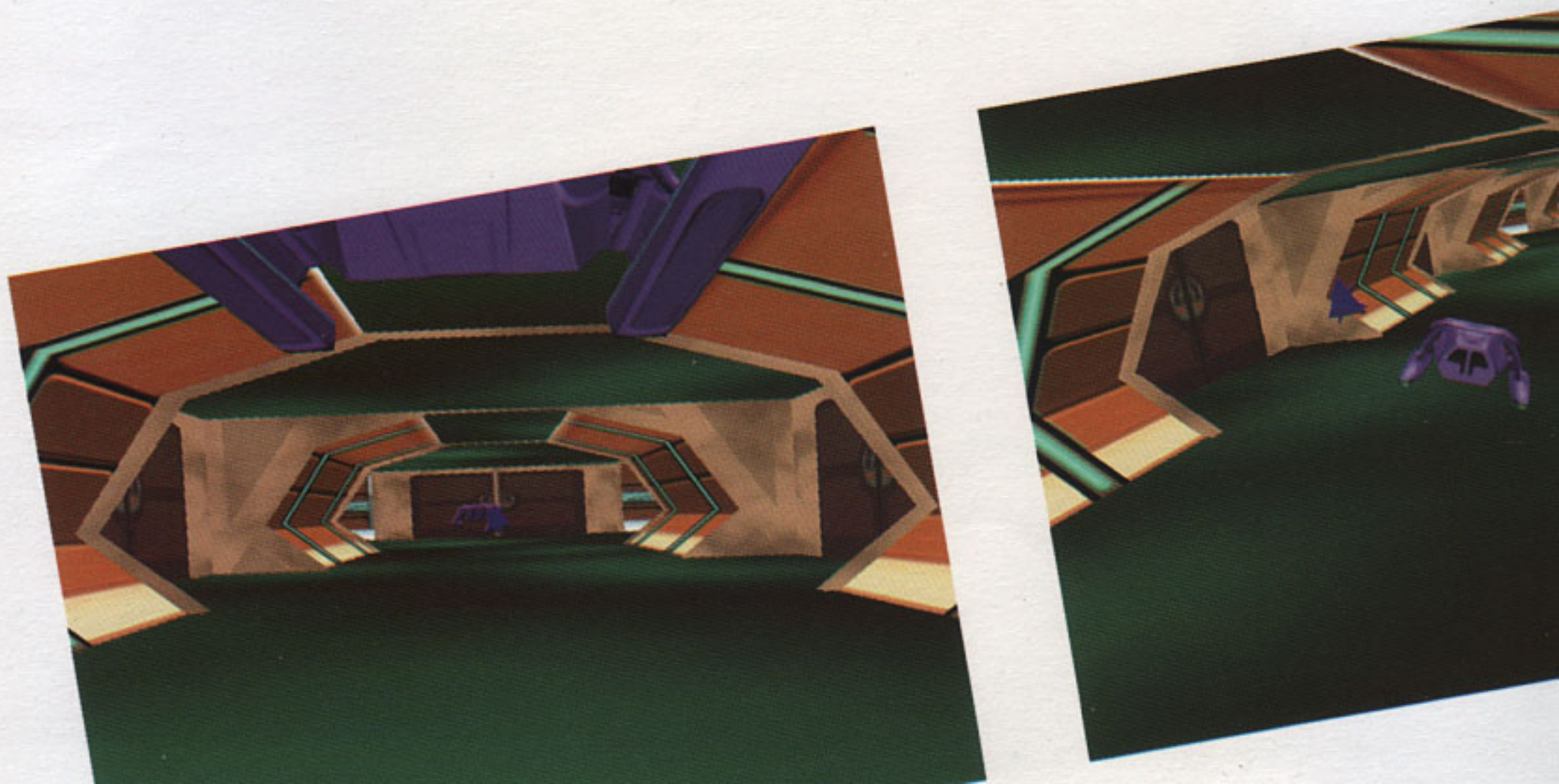
One of the things Onyx brings to Spectrum's VR games is its "rompin', stompin', texture-map-for-free. That makes our location-based stuff look really good," says Eric Johnston, a Spectrum technical manager who supervises VR development. The ability to do fast, high-quality texture mapping takes Spectrum's 3D games

away from the low-quality look video games have been plagued with for years. But cost-effectiveness is where Onyx graphics really shine.

"We would have to write a lot of code to do the simulations IRIS Performer™ development software handles for us," says Johnston. "We can typically replace about 200 non-textured polygons with one textured polygon on Onyx, which means we get two orders of magnitude gain in resolution and performance. And having Z-buffering right in the hardware takes much of the burden off the application developer."

An example of the effect this has on games development is a recent project for Edison Brothers of St. Louis, who operate hundreds of arcades. Johnston describes it as a "high-tech Capture the Flag," in which two teams of three people try to get to the opponents' end of a Virtual Reality arena and take control. The entire high-end video experience is synthesized in real time by Onyx as the game progresses.

For the arcade operator, the advantages of Onyx in this application are realism, fast rendering, multiprocessor architecture, and the fact that a software change creates a totally new VR experience. But other developments now under way will make Spectrum's LBE games even more profitable for companies like Edison Brothers.

"The general public will become addicted to levels of interactivity and visual realism offered by these high-end VR experiences," said Tom Garland from Silicon Graphics. "The technology will only become more powerful and less expensive and will ultimately find its way into the home through our alliances with partners like Time Warner Interactive and Nintendo. Software companies like Spectrum will have games on various platforms from the home to theme parks with varying degrees of immersion."

"As these other graphics machines hit the home," says Johnston, "many will be able to do texture mapping and pseudo Z-buffering, and operate at different speeds and resolutions, but they'll all be polygon-based and have floating-point maps. The Silicon Graphics machines are letting us do that development now so we can transfer it over to the new machines when they arrive. Essentially we're getting a jumpstart."

In all of Spectrum's ground-breaking areas —feature films, LBE, new home platforms —Onyx cuts development time dramatically. "The decision to go with Silicon Graphics machines was made on the basis of how much development time they would save us," says Johnston, "Our emphasis throughout the whole thing has been to

One of the things

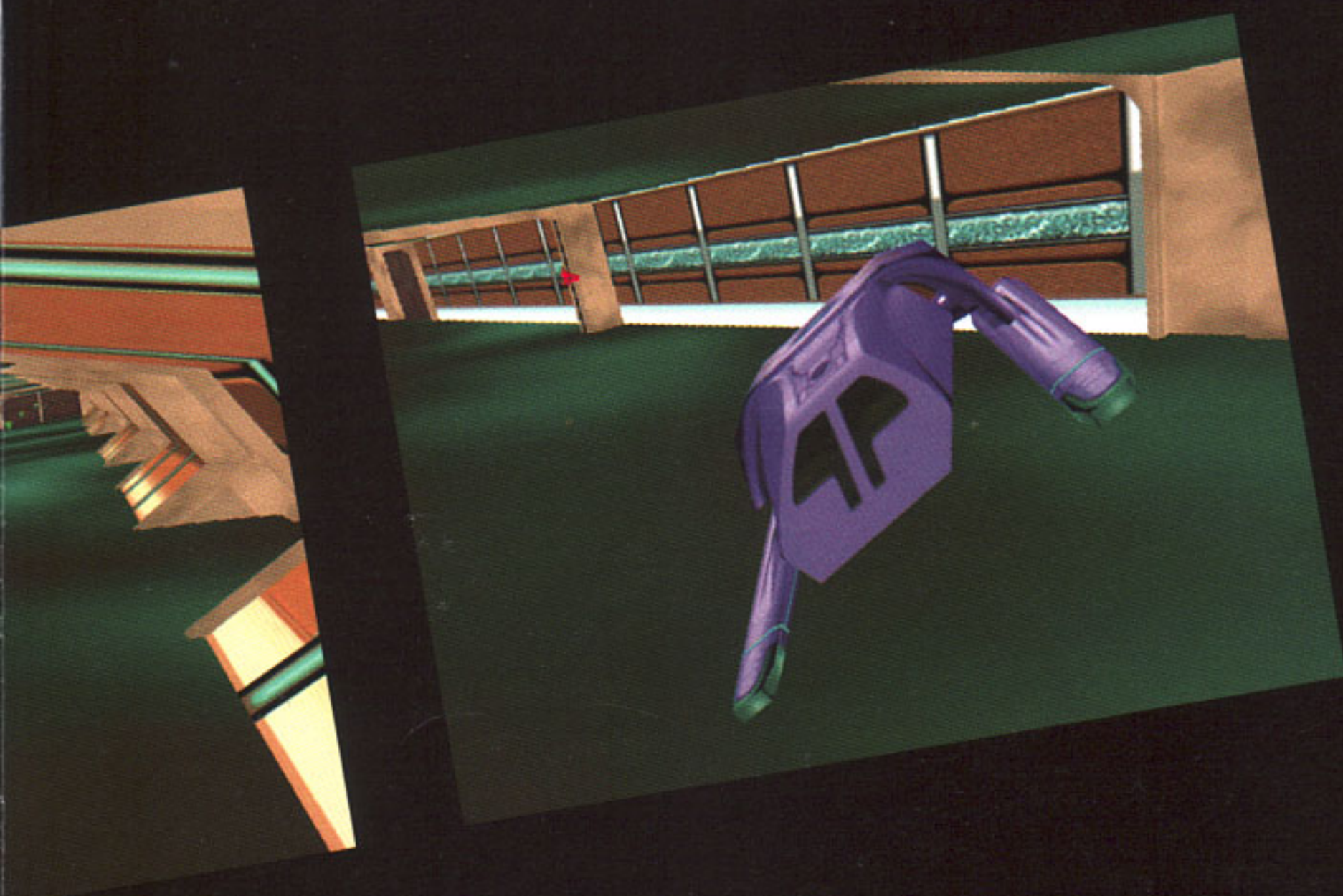Onyx brings to

Spectrum's VR

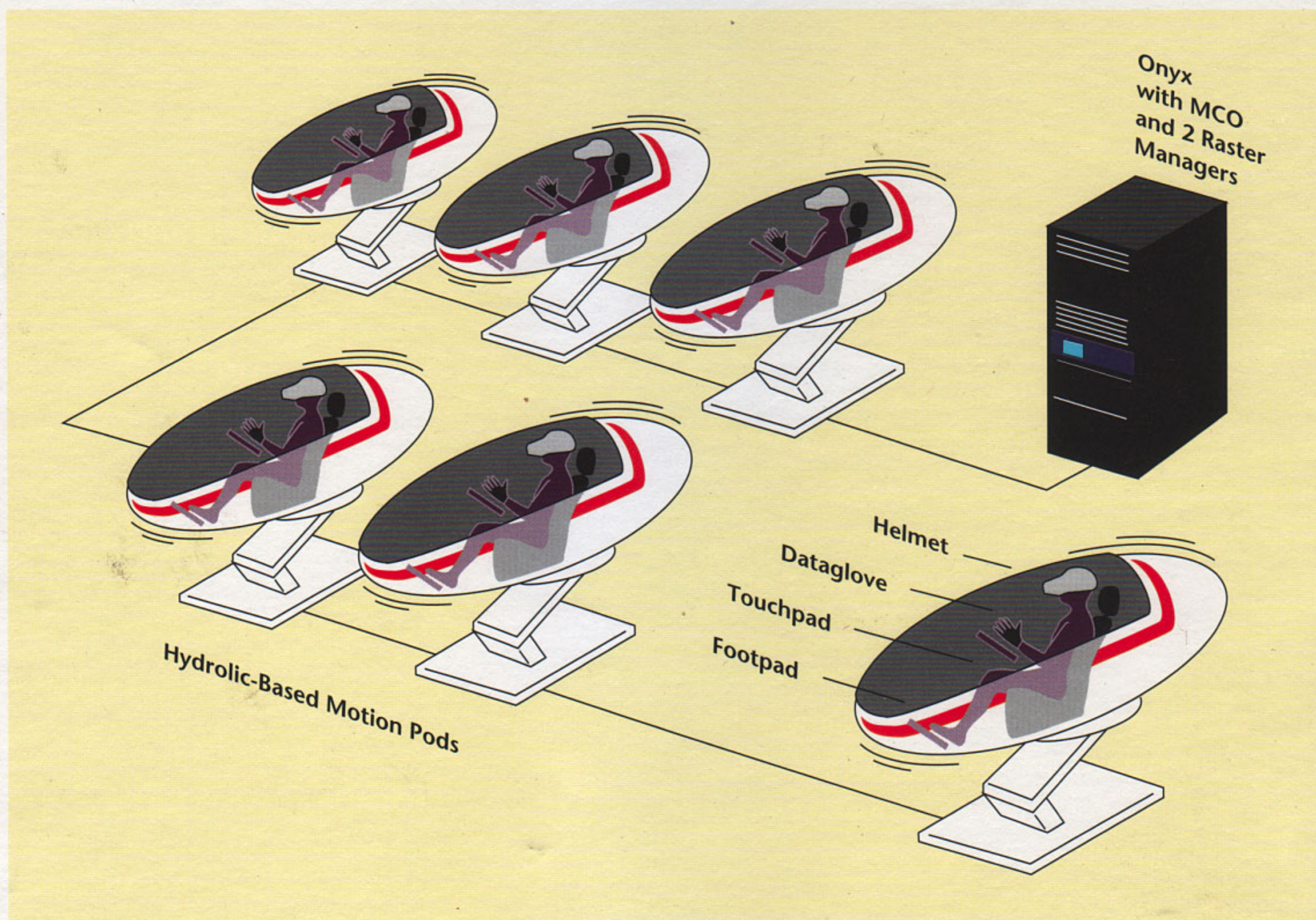games is its

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Onyx
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Managers

Helmet
Dataglove
Touchpad
Footpad

Hydrolic-Based Motion Pods

System configuration

put together a set of tools and methods and individuals that are very efficient at creating an extremely high-quality 3D experience. We're the one group in the company that gets no sympathy. If we decide to try something that would take a week to do on another platform, we can sit down and get it working in an hour." Johnston's VR group of three software engineers used Onyx to take the Edison Brothers project from concept to completion in just six weeks. That left just two final weeks to polish the look, the fun, and the playability of the game. "To do that on another platform," says Johnston, "you'd probably have to double the people and double the time —a rough guess, but that's typically what I'd

expect, given the same software base. Without our software base, which uses IRIS Performer, it would have taken us up to ten times as long."

"The thing we prize most about Onyx is that it's a true graphics machine. Typically, video games developers have been given machines that were meant to do accounting and asked to make them do flight simulation. Onyx is a machine we don't have to hack our code to."

Spectrum's creative energy, accelerated by the graphic power of Onyx, is taking interactive entertainment a giant step into the future.

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