

Capturing "Wild Ocean"

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As the ocean water cools off the coast of South Africa, massive schools of sardines migrate along the KwaZulu-Natal Coast in search of food, while dodging predators—such as sharks, dolphins, whales, and gannets—who gather to feast on them.

In the Fall of 2007, as these predators approached from air and sea to eat the sardines—these feeding frenzies were captured by Director of Photography D.J. Roller wielding a specially designed Cameron/Pace Fusion 3D HD camera system with Fujinon HD lenses for the IMAX 3D film, "Wild Ocean," released by Giant Screen Films in March 2008.

With its superior HD clarity and 3D realism, "Wild Ocean" gives viewers a sense of what it's like to be in the midst of this underwater life and death struggle.

As the president of Liquid Pictures in Atlanta, GA, Roller's DP credits include underwater cinematography for several episodes for "National Geographic Explorer," PBS' "Nova," "Deep Sea Detectives;" as well as "Ghosts of the Abyss," a 3D film directed by James Cameron about the Titanic. Roller's filmography also includes many pioneering HDCAM production expeditions in the 1990's to Antarctica and other harsh, remote locations for National Geographic Channel, Discovery Channel, and "Nova."

A 3D HD Camera is Born

While working on "Ghosts of the Abyss" and another Cameron 3D film, "Bismark," Roller encountered the unique Cameron/Pace Fusion 3D HD system, which Cameron had developed in conjunction with Vince Pace of The Pace Company in Burbank, CA. The Cameron/Pace Fusion 3D HD system consists of two customized Sony HDC-F950 Cine Alta HD cameras and specially configured Fujinon lenses that all operate in tandem to converge and focus on subjects the way the human eye does to create the stereo 3D imagery.

The two Cameron/Pace Fusion camera systems that Roller took out on "Wild Ocean"—one primary and one backup that were used simultaneously—were each outfitted with two Fujinon HA10x5B-W50 HD Cine-Style zoom lenses. An additional lens was packed as a backup.

Extreme Adventure

Prior to each underwater production expedition, the primary camera system and the backup were each placed within their own watertight, aluminum underwater housing that has external controls that the operator can use to control the power, focus, iris, zoom, and other camera functions. A third watertight housing secured a companion Sony SRW-1 RGB HD tape deck.

Getting this camera equipment and the back-up gear to the remote shooting site was a production unto itself. Since there are no easily accessible beaches along this expansive South African coastline, Roller had to put the camera equipment onto two 25-foot, inflatable, rubber Zodiac boats. These boats, which carried the crew and equipment, negotiated narrow tributaries and rivers that run between rocky cliff walls and braved heavy, oncoming surf until they reached the sea. Since there is no way to prevent having waves splash into the boats, or to protect against sea spray and rain, these extreme, wet conditions present a constant threat to the delicate electronic cargo onboard.

"The ocean and camera equipment are two things that don't mix well together," Roller said. "Salt water, rain, wind, and the jostling and vibrations of the boats all presented risks to the well being of our equipment. Once we prepped the camera within the underwater housing and closed it up, we could not pop the lid open again until we returned to dry land. Opening it on-board would be

entirely too risky. It's a testament to the integrity of the camera equipment that it all worked extremely reliably despite the challenging environmental conditions we faced."

Nimble and Brave

When the boats reached the desired dive sites, the housings were dropped into the water and later retrieved by sliding them along custom, plastic slides that Roller's crew attached to the sides of the Zodiac boats. A certified veteran diver, Roller jumped into the water and gripped the camera housing and submerged it to the desired depths, anywhere from just below the surface to about 90-feet down.

Roller's production crew included fellow divers and DP/Directors Steve McNicholas and Luke Cresswell, who shared shooting responsibilities, as well as members of Frog Squad, a South African dive team that often provides support to filmmakers that come to the region to shoot. Choosing not to use shark cages, the "Wild Ocean" divers occasionally had sharks brush up against them. But Roller said that no one was injured because fortunately the sharks were far more interested in eating the sardines.

The dive team had to be extremely nimble to catch the many dramatic events that were unfolding below the water's surface. Minutes and seconds were of the essence since nature doesn't wait for cameras to roll.

Failsafe Performance

The stereo 3D images were captured and recorded in RGB-4:2:2 HD resolution until each 26 minute Sony SRW-1 cassette tape was filled. Unlike the camera housing, the tape deck's housing could be opened on the boat so that the cassettes could be changed prior to the next dive. The record deck/housing was connected to the camera/housing via an umbilical cable, which added another layer of complexity to the production because the crew had to be vigilant that the camera and deck didn't become disconnected during rigorous underwater photography.

"As I'd move the camera housing from one spot to another underwater, it was not uncommon to encounter different temperature, lighting, and visibility levels. The water would range from gin-clear to dense with particulate matter," Roller said. "Despite these challenges, the Fujinon lenses performed extremely well and offered enough latitude to respond quickly to the changing conditions. The 5mm wide angle enabled me to focus on subjects about five feet away and the 50mm telephoto enabled me to zoom out to get subjects ranging from 30 to 50 feet away." Roller added that prior to leaving for production, in mid- 2007, he went to a Fujinon service center so that the two main Fujinon HD lenses and the backup could be tuned up to optimal optical and mechanical perfection prior to the long journey during which they were shipped by air, car, and boat.

Choosing HD over IMAX

When the shooting was finished, the HD images were color graded and processed into stereo 4K 3D HD images that are projected in either IMAX or digital cinemas in HD resolution. While HD resolution is not comparable to IMAX's 70mm superior projection quality, Roller said that tests had been done prior to shooting that assured them that HD technology would be sufficient when up-converted.

"We could not have taken an IMAX film camera and underwater housing to South Africa because the entire assembly would have weighed about 1500 pounds, or ten times more than the Cameron/Pace Fusion camera and housing assembly, which only weighs 150 pounds. Because of its weight, we could not have easily shipped the IMAX equipment or even put it onto the small Zodiac boats, which were the only way to get out to our coastal production location," said Roller. The IMAX film camera equipment also out-weighs the small boat that would have carried it.

"The IMAX camera would also have limited us to much shorter film loads and caused us to wait each time we started the camera rolling before it would reach the 24 frames per second film speed," said Roller. Also evaluating the dailies would not have been as easy or immediate as it is to review the

day's HD tapes. Roller noted, "While camera and record technology is continually advancing, we always choose the tools that we feel are the most mature, reliable, and well-suited to the needs of a particular production."

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