

Shooting in Extreme Conditions

By Chip Curry

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"My career as a documentary producer happened not because I got interested in making movies about Mars, but because I genuinely wanted to go to Mars," says Sam Burbank. Burbank (www.samburbank.com) has yet to shoot on the surface of Mars, but he has come as close as you can on this planet. His work as a special correspondent and filmmaker for National Geographic took him to Devon Island, the largest uninhabited island on Earth, 300 miles from the magnetic North Pole. "Devon Island is the most Mars-like place on earth," says Burbank in his studio, located on the San Francisco waterfront. He spoke with me about his career as a filmmaker, his strategy for telling a good visual story, and about his techniques shooting in extreme conditions, particularly in the far north. Devon Island is a polar desert, as is Mars. In the summertime, when the weather warms up to a few degrees below freezing, scientists conduct research in fields such as biology, geology, robotics, and space medicine, often using the environment to simulate a Mars-like environment. Burbank was invited by National Geographic Television to make a documentary about this work. At the same time, he would be more than just a disinterested observer. Burbank often shoots single-handedly, without a crew. For years he worked as a lighting director in film and television with large crews and truckloads of equipment. But several years ago, he decided to experiment with shooting as a one-man production. He likes keeping a low profile with no crew and less gear. He compares his style to that of a writer--observing and documenting. Burbank says shooting in polar regions is tough: "There's the physical challenge of being safe in that environment; staying warm enough and staying hydrated. Then there's the filmmaking challenge on top of that." A primary concern is personal comfort. "It's tough to be productive if you're not happy: when you're wet, your hands are freezing, and you're hungry. What your shot looks like has a lot to do with the way you feel." The most indispensable pieces of equipment for his work near the North Pole are his convertible gloves. These woolen gloves have no fingertips but have integrated mitten flaps that fold over from the back. Bare fingers can be used to actuate camera functions and set microphones, then the mitten flaps roll into place to provide warmth. Another physical challenge is exhaustion. "In the land of the midnight sun, it is always light out. If a scientist who I want to follow goes out in the morning, and another goes out in the evening, I'm going to have an urge to follow both of them. Finding a way to pace yourself in an environment like that can be tough."

Technical Challenges

In addition to the physical challenges, such conditions present many technical challenges. "Probably the worst filmmaking challenge is making sure that your gear isn't destroyed--primarily by water. Even when it's not snowing or sleeting badly, you still have the problem of everything getting damp. It becomes very difficult to find places that are dry. Looking into my tent, you can see my priorities. My camera gets the good spot. In the next best spot is my sleeping pad and sleeping bag." Burbank placed his camera bag on two blocks to keep air, not ground, beneath it. He unzipped the bag, leaving it open to prevent condensation from building up inside. In order to prevent temperature transitions that cause condensation, Burbank left the camera in his unheated tent when not in use, and tried to shoot all footage outside. But there were some instances where condensation couldn't be avoided, and thus he established one of his golden rules: Bring one or several small backup cameras. Luckily, he follows his rules. At the end of a one-month stay on Devon Island, Burbank realized he still needed an important interview. Bad weather prevented an outside shoot. The only option was to work in a heated tent. He first set up the Canon XL1. "Almost immediately, the lens fogged internally. I tried another lens, same thing. So I pulled out the Canon Optura Pi." The small camera's simple lens didn't fog up, and that let Burbank get his interview. Burbank's favorite palm-sized cameras are the Canon Optura Pi and Canon Elura models 1, 2, 10, and 20. These models have been discontinued, but he prefers these versions to the later iterations because of picture-quality issues. Burbank considers these little cameras indispensable, and essentially disposable. He gives them to crew members and scientists to shoot extra footage. He connects one to his XL1 via IEEE 1394 to make backups of important interviews. He gives the cameras dangerous assignments, such as when he attached one to a box that was parachuted from a cargo plane in order to get a bird's-eye view of the drop. "Another challenge is moving gear," says Burbank. "Every day, you're heading out to some remote location following geologists and biologists. The ATVs [all-terrain vehicles] we traveled in hardly survived the terrain, let alone what we put on top of them." Instead of placing the camera on the car rack when traveling on the ATVs, Burbank carried his gear bag over his shoulder so his body would absorb the shock. Cold weather severely limits the power output of a battery. In arctic summers, Burbank carries extra batteries in his inner pockets to try to keep them warm, and only places them on the camera when he's shooting. However, even with these efforts, he estimates battery life is one-half to two-thirds of what he gets in normal conditions. No matter how severe the environment, though, Burbank makes no allowances for sloppy production. "One thing I hate to see in documentaries is a dirty lens, rain drops or schmutz on the lens. You particularly see that with wide-angle lenses like I use a lot. There's no excuse for that in any environment. You should use a lens tissue and a little bit of fluid, but I'll use anything, even a clean T-shirt. Anything is better than a lens with raindrops all over it. Just make sure you have a UV filter on your lens and all you are doing is cleaning a \$20 piece of glass. You can always throw that away if you scratch it."



Sam Burbank's shoot on Devon Island, near the North Pole, featured a Mars-like landscape, busy scientists, and freezing temperatures. PHOTO COURTESY OF PASCAL LEE, NASA HAUGHTON MARS PROJECT

Desert Challenges

When working on a project such as the Devon Island film, Burbank isn't content only to film crew members at an installation. He prefers to become a crew member and be part of the story, whenever possible. He did this while producing a three-part documentary for National Geographic Television on MDRS (the Mars Desert Research Station) in southern Utah. In Utah, NASA scientists and others live in a 30-foot-diameter by 20-foot-tall cylinder referred to as a habitat. "I was given the option of being a crew member, and I thought, 'Cool, that sounds like a great gig,' and then I found out I would be subject to the same restriction as everybody else: I couldn't go outside without a space suit. My initial thought was that I wouldn't be able to shoot while looking through a scratched face shield. But it ended up being just fine. It was a wonderful shoot." Burbank admits, "The camera operation challenges while wearing the space suit were endless. I couldn't see the viewfinder well; couldn't wear a headset. I couldn't actuate the functions on the camera. It was exhausting to work from one of these suits. A fan is blowing in your ear. We were required to wait in an airlock 15 minutes before going outside, and 5 minutes on the way back." To operate the controls on his XL1, Burbank taped a 16-penny nail to the finger of his glove. He used the distance marks on the 16 X manual lens barrel to set the focus distance. He was able to see the viewfinder's zebra patterns, and was also able to frame the shot from the viewfinder. The audio was left on automatic. One omnipresent element in the southern Utah desert is dust. Burbank recommends strict measures to deal

with it. "Always have lots of compressed air, and blow ambient dust off the lens every hour or so." He emphasizes you must first test-fire the compressed air before each cleaning to be sure no liquid is spraying from the can. He doesn't spray the inside of the camera, though. "I don't mess with the inside of the tape transport. Rather, I clean the heads maybe every 10 or 12 hours with a standard head-cleaning tape." He also blows off the tape door openings before changing tape, and has new tape ready to keep tape changes quick. But not all of the challenges were technical or environmental. "Another difficulty of the desert station was the close proximity of people, constantly being around other people, and really having trouble finding times and places to interview people. It was easy to shoot B-roll. But to actually sit down and say, 'I need you guys to quit breaking rocks down there,' 'turn off the machines down there for a minute,' or, 'unplug the fridge for a minute,' was hard."



Burbank travels light—a good thing when he needs to convince a helicopter pilot to give him a lift to the top of a butte. PHOTO COURTESY OF KELLY SNOOK, NASA

Filmmaking and Fear

On another occasion, the challenge wasn't external, but internal. While shooting windmills in Tehachapi, CA, for a show on renewable power, Burbank's drive to get a good shot let him overcome his fear of really tall ladders. These weren't ordinary windmills. "It's difficult to describe how big they are. A modern wind turbine, from the ground to the tip of the blade, can be 400 feet. The blades are longer than 747 wings. They weigh over 100 tons. You weren't seeing that with the footage I was getting from the ground. I didn't feel I was going to be able to tell the story of these windmills, and felt like I was going to be fooling the audience unless I got on top." So I decided I wanted to convince them to let me climb one. I got so excited about trying to climb the thing that I forgot my fear of ladders. This is what we all want to do in life: Push past our fears, the things that stop us from doing stuff." When he was at the top, he handed the camera to a windmill technician and conducted an interview that he used in the film to communicate the excitement brought on by standing atop the windmill at that height.



For a shoot of a NASA experiment in the Utah desert, Burbank had to follow the rules of other crew members and wear a space suit whenever he left the habitat (top right of photo). The helmet kept him away from the viewfinder, so he had to use distance markings on his lens's focus rings to get sharp images. PHOTO COURTESY OF KELLY SNOOK, NASA

Advice for the Interviewer

As our interview finished, I could hear rocket engines igniting in the next room. Burbank was digitizing footage for his next National Geographic project, a program about the X Prize, a \$10 million prize offered to the first private group to reach space. I asked Burbank to speak about what has brought him to this place in his career. "There is absolutely no way in the world I would have my job with National Geographic if I wasn't genuinely interested in the world. The things that led to me working for them happened because of genuine curiosity about the subjects being filmed." He looked up from the video monitor displaying footage of a futuristic rocket plane soaring high into the clouds and said, "The best thing you can do for a story is to absolutely care about it more than anything."

Devon Island Gear

Here is what Sam Burbank brought with him to the Arctic Circle (listed in order of importance).- Canon XL1 DV camcorder- Standard lens (16 X)- Wide-angle lens (3 X)- Manual lens (16 X)- Lightwave Systems microphone windscreen- Lectrosonic wireless mic kit- Manfrotto tripod- Headphones that covered ears- Standard BP-930 battery (1)- Extra-large BP-945 batteries (4)- Batteries for wireless mic (9 volt; 25 total) - Canon Optura Pi DV palm cameras (2)- White bounce card (1 x 2 foot)- Cans of compressed air- Very small tabletop tripod for Opturas- Canon DM50 external mic for Opturas- Raynox wide-angle adapter for Opturas- Large BP-535 batteries (2)- Standard battery (1)- Apple 500 MHz G4 PowerBook - IEEE 1394 cables (6 pin-4 pin and 4 pin-4 pin)- Lens tissues and cleaner- Pony clamps (4)- C47s (clothespins; 6 total)- Paper tape (2 inch)- Gaffers tape (2 inch)- Zip ties- Small tool kit (with Leatherman Wave, small flashlight, volt/ohm meter, miscellaneous nuts and bolts)- Mathellini grip clamp- Power inverter (12-volt DC to 110-volt AC to recharge camera battery off car or motorcycle battery in emergency)- Three ground lift adapters- Cube taps (1- to 3-way Edison plug; 2 total)- Trick-line small-diameter rope (12 feet)- Sash cord med-diameter rope (12 feet)- Black foil wrap (1 x 3 foot)- Duvatine backdrop (6 x 6 foot)- Bailing wire (12 feet)- Push pins (5/8 inch; kept in film canister)- Sharpie pens (2)

Extreme Dos and Don'ts

Here is Sam Burbank's list of dos and don'ts for shooting in extreme conditions.

Do:-

- Learn to find key light sources in everyday environments using naturally occurring bounce sources such as a white tent, the side of a building, and blue sky. Don't use direct sun as a key. In the field, video lighting is rarely appropriate or even possible. You'll be amazed how many natural key sources are out there when you know where to look.

- Perfect your color control. White balance. Practice using color filters such as CTB, CTO, plus green, and minus green to add desired or remove unwanted color in your balance.
- Get a good wireless lav mic. Use 2-inch paper or medical tape, not clips, to attach the mic to the inside of a shirt or jacket. Different brand mics sound different, so experiment with several.
- Buy as many camera batteries as you can afford, bring them all, and bring them charged. Keep them charged when in the field, especially in cold weather. If needed, wake up in the middle of the night to swap batteries on the charger.- Bring twice as much videotape as you think the shoot will require, especially in remote locations. Tapes today are small. If you don't use it, you'll have it for the next shoot.
- Bring extra food--energy bars, tuna, and the like--for yourself.
- Keep your glass clean. There is no excuse for a dirty lens, even in a muddy, snowy, cold environment. Bring a small compressed air can to blow off dust quickly. Clean schmutz off lenses daily.
- Always bring fingerless convertible gloves.
- The tapes you leave with are worth much more than the ones you arrived with. They may be more valuable than everything else you brought combined. Guard them with your life.
- Shoot all of the time and in unusual conditions. Get to know your camera's and body's limits. Get to know your cameras intimately.

Don't:-

- Don't use auto-exposure and don't overexpose your footage. Pull back a bit if in doubt, just like with color positive film.
- Don't accept the natural depth of field for a given time of day. Use neutral density filters to achieve the depth of field you desire.
- Don't let weather stop you from shooting. Most modern cameras can take a beating.
- Don't pack too quickly. Don't make the mistake Burbank did when he was shooting in Iceland in the winter and forgot his jacket.
- Don't ever let your subject wonder if you're interested in the story.
- Don't feel limited by your gear. Modern DV cameras can withstand a lot of abuse-more than most people ever attempt. Push your camera and make your imagination the limiting factor.

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