FEATURE PROPOSAL: Douglas Fox

ANTARCTIC CONFIDENTIAL:

This November, I will accompany an expedition to the remote West Antarctic Ice Sheet—arbiter of fate for a tenth of the world's population.

Welcome to the West Antarctic Ice Sheet (WAIS)—ground zero for determining how the world will experience climate change this century. At 700,000 cubic miles, it weighs in as the second-largest hunk of ice on the planet. Its melt water could lift sea levels 20 feet and inundate 600 million people who live in coastal areas. Some observers fear that the WAIS could tip into rapid collapse sometime this century.

Despite the WAIS's importance, we know precious little about it. What we do know is cobbled together by scientists whose brand of rattletrap ingenuity would seem more at home in an auto shop in Kandahar than at NASA. When Robert Bindschadler wanted to use satellite photos to study how the WAIS has responded to climate change over decades, he realized that few research satellites had ever orbited over the continent. So he searched through spy satellite photos from the Cold War. He eventually found 2 images, taken by the CIA's Corona satellites on October 29, 1963 (these satellites monitored the Soviet military; they captured photographs on spools of film, which were parachuted back to Earth and recovered mid-air by aircraft). Those photos revealed surprisingly rapid changes in the WAIS over the last 4 decades.

Other satellite glimpses show the WAIS bobbing up and down as water flows through rivers and lakes beneath it. These rivers can even flow uphill, propelled not by gravity, but by mind-bending pressures beneath a mile of ice. This water could determine the WAIS's future fate—and ours. It lubricates the ice over rocky Antarctica; changes in that lubrication could send large swaths of ice sliding into the ocean. Some climate models don't even consider it.

This November, I will accompany an expedition of 3 scientists to a remote field site on the WAIS to investigate its risk of collapse. We will visit the spot that was photographed by Bindschadler's spy satellites in 1963; those photos provided impetus for our expedition by revealing potential signs of instability in this part of the ice. (A network of subglacial rivers and lakes, discovered earlier this year in the same spot, provide further impetus to travel there.)

In McMurdo Station, Antarctica, I will undergo a week of survival and crevasse rescue training, and mix with other research teams over beer at McMurdo's 2 taverns. A Hercules military plane will then ferry expedition members to a remote airstrip on the WAIS. From there, a ski-mounted Twin Otter aircraft will transport the 4 of us to our final destination on the WAIS, where we will camp in tents for 3 weeks.

Our campsite lies on the Whillans Ice Stream, a 50 mile wide, 2,500 foot thick conveyor belt of ice that oozes into the ocean. The team will plant a network of sensors to monitor its movement to the nearest centimeter for 2 years. It will be the first experiment of its kind in Antarctica, with sensors newly designed to withstand the sunless, battery-killing cold of winter. The team will also use ice-penetrating radar, to map the rivers and lakes half a mile below the ice surface. The radar will also provide a window thousands of years into the ice sheet's past, mapping networks of cracks that document its past movement, and identifying layers of volcanic ash in the ice that were once flat, but have bent and puckered during movement.

We will travel 100-200 miles per day on snowmobiles as we place instruments. We'll use ice radar units mounted our on snowmobiles to detect and avoid crevasses in our path (some are large enough to swallow a skyscraper).

Weather at our field site should be perfectly mild—or perhaps that depends on your perspective. "It is the banana belt of Antarctica," says Slawek Tulaczyk, the glaciologist leading the expedition. By that he means that we'll still spend our days wearing down parkas, and at night we'll sleep embracing our laptop computers—to make sure they stay warm enough to boot in the morning.

I will distill the best and worst moments of this 6-week expedition into a feature for *Smithsonian*. I will narrate the team's activities, and sketch the debate regarding risk of ice sheet collapse. I will describe the rigors of working in a place nearly as isolated as the Moon, where the transport of every single AA battery is planned a year in advance. And I will tell the backstory of how Bindschadler and others have explored the WAIS through satellites.