Mars Rovers Robotics Planetary Exploration Atacama Xenobiology

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In the March 2006 issue of IEEE Spectrum, staff editor Jean Kumagai reports on what she saw and heard while observing the field team last fall. The researchers come to the Atacama because, more than any other on Earth, it approximates the barren, arid rockiness of Mars. Their robot, dubbed Zoe, is far more sophisticated than the current crop of rovers. For one thing, it can run autonomously, without having a human driver constantly feeding it instructions.

It can also travel several kilometers at a stretch. A built-in fluorescence imager inspects the soil for signs of proteins, lipids, DNA, and other signs of life.

In addition to the field team assembled in Chile, a group of geologists, biologists, and others are gathered in Pittsburgh. They are the science team, and it's their job to parse the data that Zoe collects and then send back a set of instructions to launch the next day's mission.

The idea is to simulate, as much as possible, an actual mission on Mars. So at each site, the robot "lands"--that is, it's disgorged from the back of a moving van--takes a reading of its surroundings, and then uploads photos and telemetry data via satellite to Pittsburgh. The team in Pittsburgh pores over the data and then discusses (or, more often than not, argues over) what kind of investigations and maneuvers the robot should do next.

Life in the field, as Kumagai observed, has its trials and its joys. Despite

the bad food, freezing temperatures, and less than luxurious living quarters, the researchers clearly find the camaraderie and the challenge of doing cutting-edge engineering worthwhile.