Life in the Atacama Life Detection Imaging System

Zoë is equipped with a specialized set of instruments to detect the components of life.

The life-detection system is located in the rover's underbelly and includes a Fluorescent Imager, which consists of:

1. a flashlamp with an assortment of interchangeable filters that emit light of varying colors to excite the fluorescent probes and any chlorophyll present in the sample;
2. a digital camera with an assortment of interchangeable filters to record images of the terrain, detect the presence of chlorophyll in the sample, and detect the fluorescence of the nucleic acid, protein, lipid and carbohydrate probes

Once Zoë begins traveling a pre-determined course, the rover will stop at designated areas for site analysis.

Zoë's Life-Detection Strategy:

1. The flashlamp will illuminate the sample area to create a color image. Scientists can use this basic image to understand the texture, color and other attributes of the sample.
2. The flashlamp will bathe the sample area in different colors to detect any background fluorescence, such as inherent mineral fluorescence.
3. A scientist will follow the rover and spray the sample with a softening agent to dislodge any biofilm or spore coating, thus exposing the probes to any molecules of life present. *
4. A scientist will spray the sample with a sequence of life-detection probes. *
5. The rover's flashlamp will alternate filters to excite each of the four probes.
6. The digital camera will alternate filters to select for the presence of each of the four probes and capture dozens of images.
7. Scientists will process the images to look for indications of the presence of nucleic acid, protein, lipid and carbohydrate.
8. The rover will back up and record a spectrum of the sample area using the visual/near-infrared spectrometer to detect any chlorophyll present and to detect signatures of rocks and soils. *
9. Scientists will follow the rover's path, conducting "ground truth" experiments to collect samples examined by the rover. They will return the samples to base camp and to laboratories for detailed analysis.

* In the future, the softening agent and the four probes will be sprayed from instrumentation located underneath the rover. In addition, plans for the future are to mount a spectrometer alongside the Fluorescent Imager in the rover's underbelly.