

Life in the Atacama

Zoë at a Glance

Version 1.1 (9 August 2004)

Overall

Astrobiology is the study of life in the universe. Zoë, the Greek word for life, is an astrobiology rover designed to seek life in desert environments. Zoë is a four-wheel drive, dual-axle steer vehicle. It is purely solar powered with rechargeable batteries for storage. It has inertial and visual sensors to determine its location and cameras for near-field obstacle avoidance and far-field terrain modeling. Onboard computers enable it to navigate autonomously and avoid obstacles. It carries a fluorescence imager to locate chlorophyll and organic compounds, a spectrometer for mineralogy, and environmental sensors.

Dimensions

Length: 2.7 m (8.7 ft)

Width: 1.7 m (5.6 ft)

Height: 1.0 m (3.3 ft) to solar array
2.0 m (6.6 ft) to mast

Speed: 1 m/s (2.2 MPH)

Wheel diameter: 0.66 m (26 in)

Weight

Estimated 180 kg (400lbs)

Energy

2.4 m² solar panel

900 Gallium Arsenide (GaAs) advance triple-junction cells

1400Whr Li-Polymer secondary storage, battery packs (2)

Mobility

Normal incline traversal: 20° in soft materials

Maximum incline traversal: 45° under ideal conditions

Minimum turning radius: 2.5 meters

Maximum obstacle clearance: 30 centimeters

Instrument Payload

Fluorescence imager: Zoë's fluorescence imager is mounted underneath the body and has two motions, one lateral and one vertical. It has a cooled-CCD camera with a filter wheel containing 10 different band-pass filters and a Xenon flash-lamp with a filter wheel containing 6 filters. Through appropriate combination of these filters, it can illuminate and detect isolated wavelengths of fluorescence associated with particular molecules, such as minerals, chlorophyll, and applied markers bound to DNA, protein, lipid and carbohydrate.

Visible/near infrared reflectance spectrometer: Zoë carries a visible/near infrared (350nm – 2500nm) spectrometer with a 1° foreoptic mounted on the mast pan-tilt. Spectra from this instrument can be analyzed to determine the mineral and atomic composition of observed materials. The spectrometer can identify chlorophyll as well as characterize the mineralogy of the habitat.



Stereo panoramic imager (SPI): The stereo panoramic imager camera is a high-resolution camera triplet that allows the scientists to get a panoramic view of the rover's surroundings as well as high resolution stereo pairs to reconstruct the three-dimensional geometry of the scene.