Atacama Desert Trek: A Planetary Analog Field Experiment

Field Robotics Center
The Robotics Institute
Carnegie Mellon University

Overview

Nomad- Planetary precursor robot

Primary Objective:

Travel 200 km

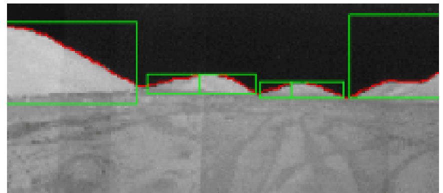
Secondary Objectives:

- Involve the public
- Perform remote geology
- Evaluate panospheric camera
- Autonomous safeguarding
- Demonstrate antenna pointing
- Demonstrate skyline positioning
- Evaluate locomotion
- Transcontinental Supervision

Atacama Desert, Chile

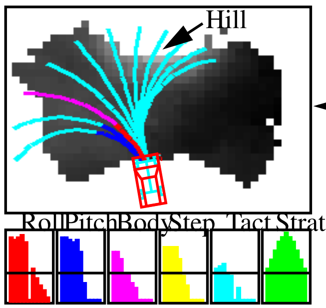
June 18- July 31, 1997

Atacama Desert Trek Technology

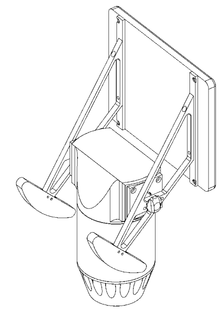


Skyline Positioning

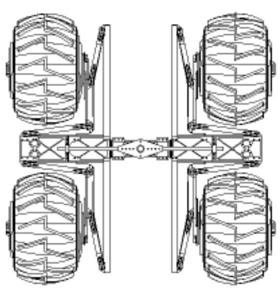
Safeguarded Teleoperation

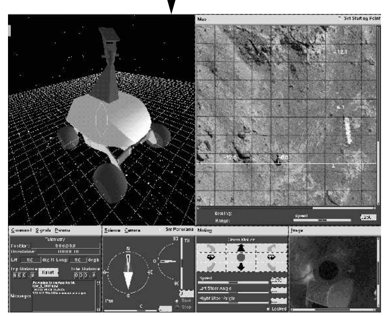


Antenna Pointing Mechanism



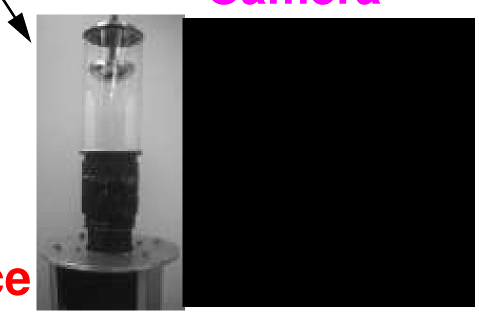
Transforming Chassis





Public Outreach/Remote Science

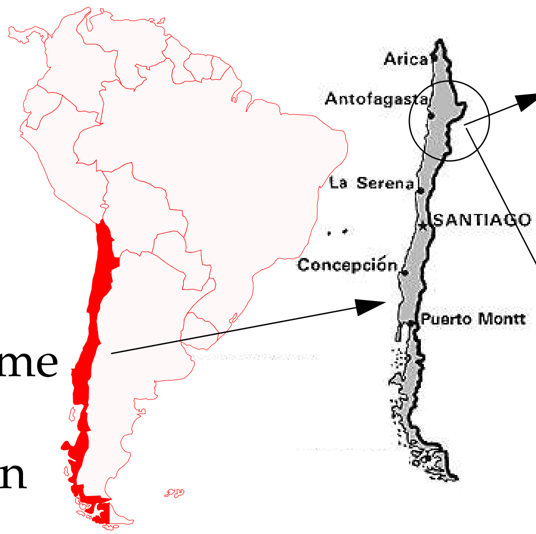
Panospheric Camera



The Atacama Desert, Chile

Planetary Analog Terrain

- Craters, rocks and loose sand
- Complete lack of vegetation
- Varied topography



Operational Suitability

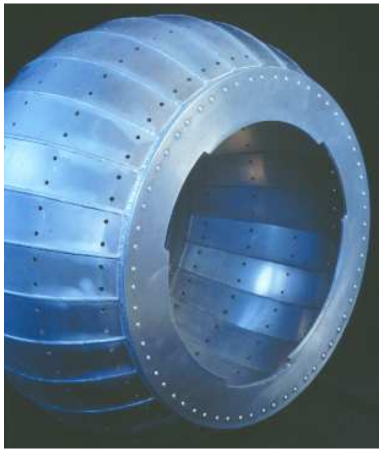
- Eastern Daylight Time
- Easy access
- Presence of NASA in Chile

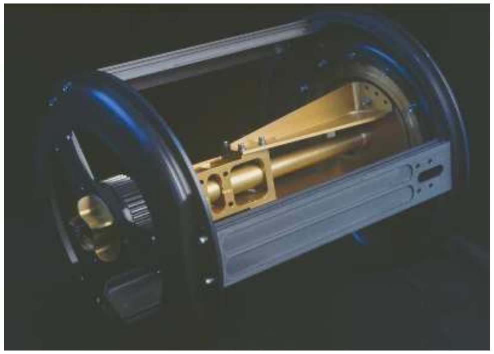
Vital Statistics

- Average elevation: 2400 m
- Temperature: $0^{o}C$ to $25^{o}C$
- Precipitation: 1 cm/year from fog
- Rainfall: once every 100 years

Locomotion Electromechanism

In-wheel independent drives for improved traction and motion control





Transforming chassis provides terrain adaptation, deployment, and steering capabilities

- **An actuator drives a pair of four-bar mechanisms on each side of the rover**
- **Motion of the follower linkages increases rover footprint**
- **Wheel heading changes while deployed, enabling steering**