Site C Introduction

Life in the Atacama 2005
Science & Technology Workshop
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- Pre-landing analysis
- Derived hypotheses
- Daily planning & program
- Post-ops overview

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Site C

• **Goals**
  - Find life!
  - Science demonstration: identify ‘prime site’ for future analysis/return
  - Technology demonstration: return to ‘prime site’ and/or landing site
  - ‘Scanning’ traverse—frequent standard observations along traverse with selected focused investigation

• **Strategy**
  - Pre-landing analysis i.d. potential habitats long-term planning daily planning
  - Regional geologic/biologic survey ‘tuned’ to spatially-scaled hypotheses (orbital-local-micro scale observations)

• **Traverse summary**
  - 7 sols
  - 10 *unique* locales
  - ~8 km planned traverse
Pre-landing analysis
Derived hypotheses

- Small topographic basins (due to ponding, etc.) represent enhanced biological potential. These areas also appear as high albedo in ASTER 321 image, suggesting potential presence of evaporite lithology.
- Quartz mineralogic signatures identified using thermal emission spectra indicates increased potential for hypolithic (photosynthetic colonization under rock) habitats.
- Geologic materials exposed at the surface with both high reflectance in the near infrared and relatively low reflectance in the visible wavelength spectra using VNIR suggests the presence of evaporite minerals (e.g. gypsum).

*Note*: solar insolation (a function of location time of year, local atmospheric conditions and micro- to macro-topography) provides a strong control on habitability. Certain locations may benefit from increased insolation while others may benefit from shade (e.g. many non-polar desert ecosystems).

*Note*: elevation generally increases eastward along the major axis of the landing ellipse; under certain circumstances, higher altitude terrain may preferentially trap atmospheric water vapor, as well as south-facing slopes.
Daily planning & program

• 1300: Start. Individual work time.
• 1500: Meeting.
  1) Review previous day’s data in light of previous days’ hypotheses.
  2) Outline plan for tomorrow beyond ending locale using available data.
• 1700: Multitask.
  Operations: Upload outline plan actions to Eventscope & text document.
  Analysis: Continue data review.
  Coffee/snack.
• 1800: Initiate downlink; daily summaries.
• 2000: Downlink complete; individual review of incoming data.
• 2100: Processing complete; rover team engineering report.
• 2130: Data overview [silent].
• 2200: Planning: further ops at previous locales?
  No: implement outline plan.
  Yes: incorporate requested actions in to outline plan.
• 2200-2300: Triangulate current location and planned locales. Optional coffee/snack.
• 2250: Notification—clock for action changes running out (Kiva Han closes in ten).
• 2300: Finalize planned traverse in Eventscope, text support doc; changes to plan.
• 2345: Break...be on the ball for:
• 2400: Review plan.
• 0100: uplink.

Note: team activities are bold, deadlines are red, and optional break times are italic.
Site C: post-ops overview

- Sol 8 (locale 25): site C landing—high resolution pan & long-term planning
- Sol 9 (26): evaporites? Heading SW to topographic low and possible change in mineralogy
- Sol 10 (29, 30): tourism—traverse over several geomorphic units gaining vantage on hilly unit.
- Sol 11 (34): heading to light-toned units in S.
- Sol 12 (36, 38): cont’d
- Sol 13 (39-41): going on a 5k run—South to large drainage
- Sol 14 (25): heading home…one stop at previously-identified site of interest
Site C: post-ops overview
Site C critical analysis - science

! We CAN i.d. a site of interest and return to it, as well as the landing site

- Accurate return (meter-scale) required for microclimate and habitat
- 2+ sols’ operations currently required for this

• Standard action request for scanning traverse
  - Low-resolution greyscale SPI panorama
  - Cross-patterned VNIR and compass VNIR
  - Single FI frame with dyes
Site C critical analysis - science

- Templates needed for data *analysis* and *presentation*, not just planning

  - *e.g.*, Fisher’s FI and Marinangeli, Dohm’s Geo presentation; difficult analysis & presentation of weather data

**Satellite:** Visible are patches of light materials and dark material and scarps.

**Field-based:** Background: Sky appears mostly sunny, though hazy (similar to yesterday). Other promontories, which were visible yesterday on the horizon, are no longer visible. *Foreground:* Abundance of distinct rocks (relatively large ~ 15 cm or greater) is considerably less than Locale 26. In addition, polygonal patterns are visible. When compared to the landing site, few if any larger dark rocks and white clasts are visible. In addition, polygonal patterned ground is thus far unique. **Microscopic:** Diversity in lithology based on color, shape (angular to rounded; some elongated), and size (generally centimeter or less). Greater percentage of white surface when compared to the non-plowed surfaces of the previous 2 localities.
Site C critical analysis - logistics

- **IT:** better telecon, printing capabilities

- **Planning:** huge improvements in Eventscope
  - Automated generation of text support documents
  - Implemented frequently-requested actions, ability to recall actions from previous locales

- **Common language is mission-critical**
  - **Action.** Task performed by a rover payload element.
  - **Locale.** Anywhere the rover stops and deploys a payload element.
  - **Outline plan.** Plan developed independent of prior day’s data.
  - **Plan.** A set of locales and associated actions, waypoints.
  - **Support document.** Text version of plan for field team.
  - **Target.** An object/area chosen for investigation; defined by spatial coordinates of action.
  - **Waypoint.** A rover stop with no associated actions.