CALIBRATION SITES

Facilitator:	Carle Pieters
Recorder:	David Smith

CALIBRATION SITES

1. TITLE SLIDE (with facilitator & recorder)

2. LIST of CORE TEAM MEMBERS

3. LIST of PARTICIPANTS

4. BACKGROUND PRESENTATIONS PROVIDED

5. COORDINATED CALIBRATION -1

6. COORDINATED CALIBRATION -2

7. COORDINATED CALIBRATION -3

8. COORDINATED CALIBRATION - Additional Comments in Plenary

CALIBRATION SITES
CORE TEAM MEMBERS

- Carle Pieters Facilitator
- David Smith Recorder
- Manabu Kato
- Christian Veillet
- Ed Guinness
- David Paige
- Bernard Foing
- Harlan Spence
- Igor Mitrofanov

CALIBRATION SITES
PARTICIPANTS

- Carle Pieters Facilitator
- David Smith Recorder
- David Paige
- Bernard Foing
- Harlan Spence
- Igor Mitrofanov
- Kurt Retherford
- Rick Saylor
- Justin Kasper
- Joe Mazur
- Frank Lemoine
- Jeffery Gillis-Davis
- Samuel Lawrence
- Josh Cahill
- Brett Wilcox Denevi
- Ernst Cisneros
- Randolph Kirk
- Maria Zuber
- Brent Archinal
- Lisa Gaddis
- Yoshimitsu Tanaka
- Koji Matsumoto
- Hiroshi Araki
- Marc Foote
- David Blewett
- B. Ray Hawke
- Jerry Fishman
- Roger Clark
- Michael Wargo

CALIBRATION SITES

BACKGROUND PRESENTATIONS PROVIDED

- Carle Pieters
- Jack Trombka

COORDINATED CALIBRATION
Topics & Issues - 1

- Primary objective is select a small number of sites, especially on which data can be released early for use by other missions
  - What data sets will be inter-compared?
  - What sites and are they self-consistent enough to be used for spatial extrapolation
    - do optical instruments provide the same values?
    - do mineralogy values agree?
- It might be more useful to select 4 or 5 sites per type of instrument, rather or in addition to a general 4-5 sites?
- Calibration standards would be beneficial to many instruments, but
  - some instrument results are model dependent
  - some are based on the data provided by other sources
- Targets near the poles will present opportunities to observe changing light conditions and confront some of obstacles that are unique to the polar regions.
- Some targets are suitable for monitoring changes with season, illumination etc
- Calibration could help understand cross-talk between instruments, which is sometimes a potential problem

COORDINATED CALIBRATION
Topics & Issues - 2

- Secondary calibration targets should be defined
- Consider using the sun/earth/stars for calibration
- Must consider effect of the size of target and the instrument field of view in any comparison.
- Propose five or more calibration sites (~200 km^2+) proposed; specific well focused areas which everyone agrees to use
  - Sites selected to be representative of different terrains
  - Will allow cross-comparison between multiple instruments, missions and data sets, also offers opportunities for those new to lunar exploration to become more familiar with the overall lunar environment
  - Apollo 16, Lichtenberg, Hadley Rille (more challenging), South Pole Aitken Thorium “Anomaly”, Tycho Crater, and LCROSS impact site have been suggested
  - Large, homogeneous mare site is also recommended as a site selection
    - Suggested that we may like to select a region that has been characterized in the lab (such as one of the Apollo sites)
  - Recommend that at least one site selection resides at higher latitudes that are more accessible to missions

COORDINATED CALIBRATION
Topics & Issues - 3

- Sites that offer multiple science opportunities are generally highly complex, and not accessible or suitable to ALL instruments
- Data should be released early enough to be useful to all participants in a location and format that is functional for everyone
  - Many missions will take time to acquire high resolution data on these sites
- Scale of calibration sites are a factor for many instruments
  - Inter-comparisons should be on the same scale
- Not all sites will be relevant for all instruments
- Differences in sampling depths present challenges for comparison
- Observations on a single orbiter will be simultaneous between instruments so that boresight differences can be sorted out
- Timeframe of calibration site selection is important - first launch next summer
- Phase angle calibration possible and needed
- Calibration standards will enable interpretation of the space data
- Image convolution
  - Edge enhancement techniques can insert erroneous high frequency signals

COORDINATED CALIBRATION
Additional Comments in Plenary

- Sample return sites should be on an extended list of calibration sites
- Apollo 11 site is a good candidate for orbital radar and Arecibo radar
- Lamp will get an early global map and needs a high latitude "calibration" site
- A write-up on calibration could be very beneficial to EPO
- SELENE team will discuss suggestions internally and provide input separately
- Can we put together a "calibration cookbook"?

- General recommendation:
  To the suggested 5 sites
  - Add a high latitude calibration site
  - Add a polar calibration site
  - Add a homogeneous mare site.