ESS Science Planning and Lunar Workshop Overview

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ESS Science Recommendations

- **A Lunar-Based "Earth Observatory" Concept**
  - permanent Earth-viewing location
    - ability to "start simple" and expand over time
    - worthwhile at all from the proposed polar location?
  - 12 original science objectives defined
    - many of which have now been deemed incompatible with the proposed polar location/architecture
  - directive as a subcommittee to:
    - finalize the list and rank the objectives
    - recommend wording or other changes to clarify the objectives

ESS Science Recommendations

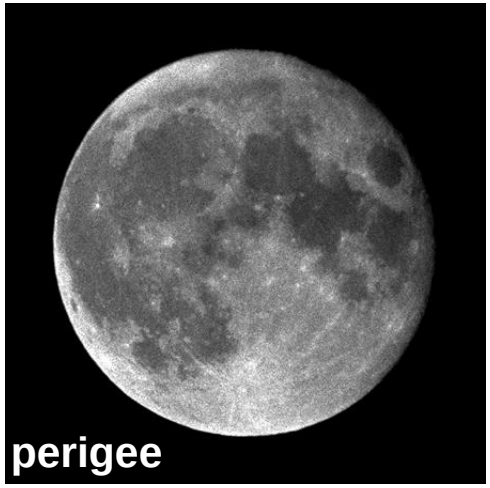
- **Earth Observations from the Lunar Surface**
  - **Land Surface Imaging (UV/VNIR/SWIR/TIR)**
    - land surface mineralogy, land use/land cover change, and biomass/ecosystem monitoring
  - **Monitoring of Thermal Anomalies (TIR)**
    - volcano/fire hazard detection
  - **Atmospheric Composition (UV/VNIR/SWIR/TIR)**
    - surface fluxes of gases, global-scale transport of pollution, and ozone and aerosol dynamics
  - **Solid Earth Deformation (InSAR)**
    - topography, altimetry, etc.
  - **Ice Surface Monitoring**
    - dynamic response of major ice masses to climate change

ESS Science Recommendations

- **Earth Observations from the Lunar Surface**
  - **Sun-Earth Connection (VNIR)**
    - effect of solar flares and CME's on the Earth's atmosphere
  - **BRDF of the Earth (UV/VNIR)**
    - calculate the Earth's radiative balance
  - **Cal/Val for Earthshine**
    - true Earth albedo (and cloud/ice %) from the moon
  - **Lightning**
    - development of a complete lightning climatology
  - **Paleo Solar Constant**
    - past climate variability as driven by solar input
  - **Transponders for LEO Satellite Constellations**

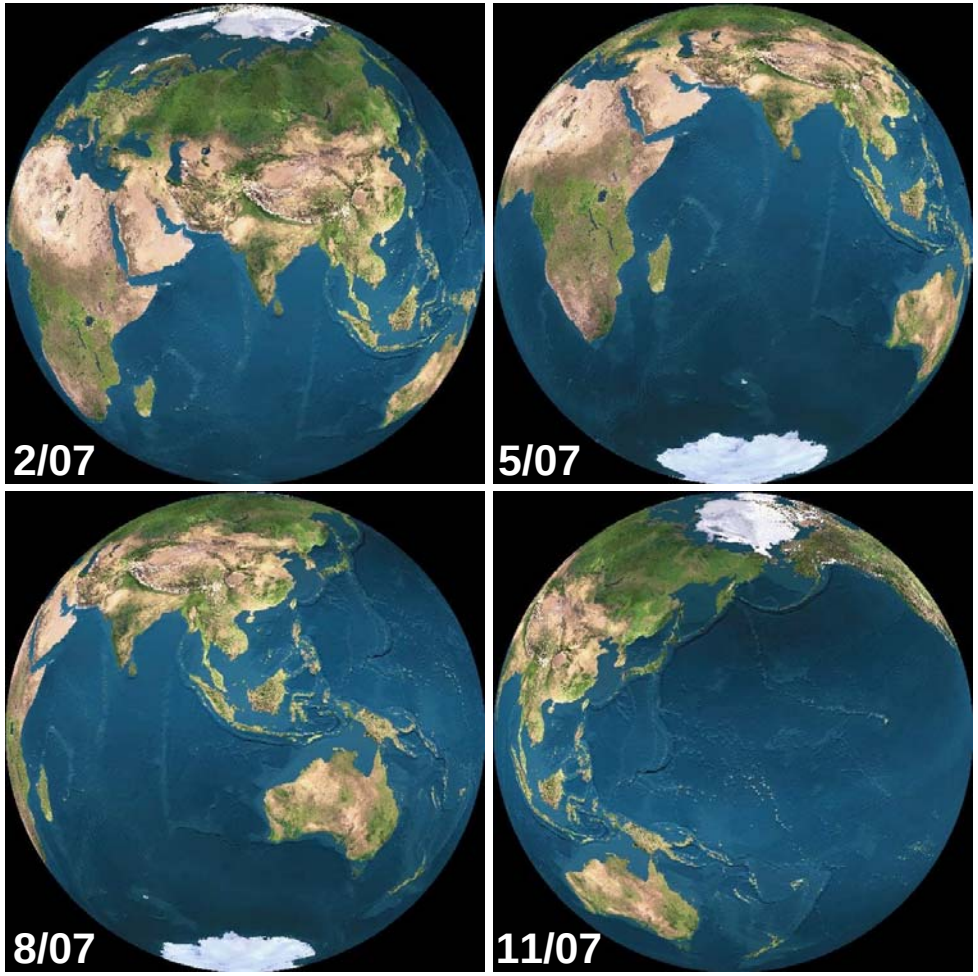
Lunar Based Earth Observatory

- **Challenges:**
  - orbit change of ~5%
  - ~10X further than GEO
  - lunar environment
  - limited views of Earth



Lunar Based Earth Observatory

- **Challenges:**
  - orbit change of ~5%
  - ~10X further than GEO
  - lunar environment
  - limited views of Earth
- **Benefits:**
  - very stable platform
  - phases of Earth



ESS Workshop Sessions

- **Today**
  - P. Christensen: *"Lunar Earth Observatory Concept"*
- **Wednesday Morning Break Out**
  - THEME: *A Lunar-Based Earth Observatory*
- **Wednesday Afternoon Break Out I**
  - THEME: *Land Imaging and Solid Earth Science*
- **Wednesday Afternoon Break Out II**
  - THEME: *Atmospheric Composition and Climate*

ESS Workshop Sessions

- **Thursday Morning Break Out**
  - THEME: *Earth-Sun Interactions [HPS-ESS]*

- **Others**
  - Wednesday Afternoon: Astrophysics
    - M. Turnbull: “An Autonomous Lunar Investigation of the Variable Earth”
    - N. Woolf: “Science and Astrobiology from the Moon or near Moon”