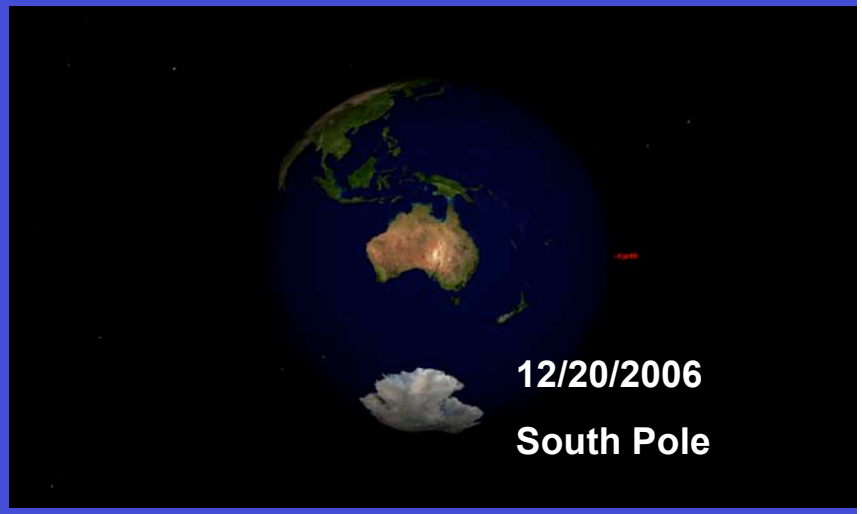
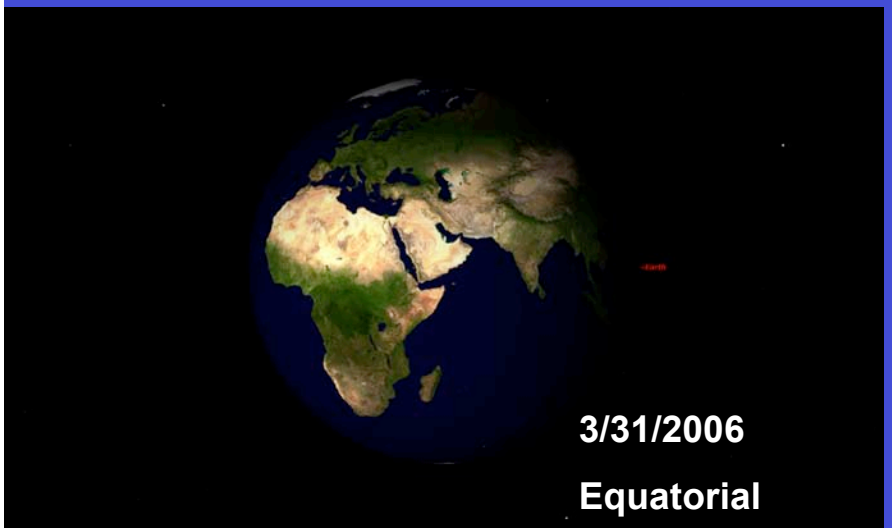
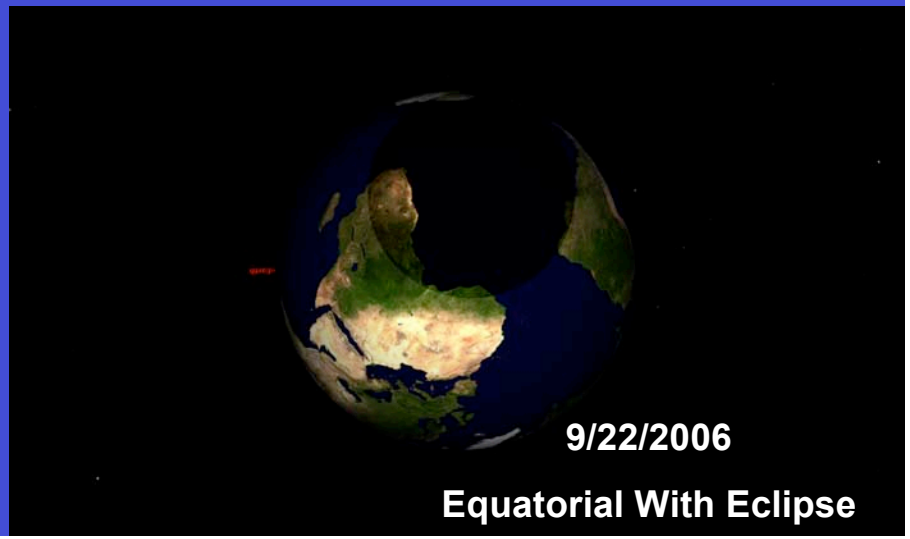
EARTH OBSERVATION FROM THE MOON
Preliminary findings from Earth Science Subcommittee

A Moon observatory provides full-disk view of the Earth (images from Jay Herman)







GENERAL CONSIDERATIONS ON EARTH OBSERVATION FROM THE MOON

- Continuous full-disk view (sunlit half the time) enables many Earth—viewing applications from space with sub-km horizontal resolution:
  - Global mapping of Earth surface and atmosphere
  - Altimetry
  - Coordination of satellite constellations

  Probably not suitable for lidar, weather observations
- Advantages relative to human-made satellites:
  - Enabling of large telescopes, antennas, power supplies
  - Stability of platform
- Challenges:
  - Terminator crossing complicates radiative transfer
  - Day/night heating differential
  - Dust
  - Moonquakes

FILLING OUT THE "EARTH OBSERVATION OBJECTIVES" SPREADSHEET

- 12 Objectives listed and described (summary/value):
  - Solid Earth, topography, altimetry, ice flow, vegetation map (InSAR)
  - Atmospheric compostion (UV/Vis/NIR/TIR)
  - Sun-Earth connections (0.06-1 μm, view both Earth and Sun)
  - Land surface mapping (UV/Vis/NIR/TIR)
  - Ocean color
  - Monitoring of hot spots (fires, volcanoes) (TIR)
  - Paleo solar constant (temperature stratigraphy in borehole)
  - BRDF (bidirectional reflectance) of Earth (0.3-1.5 μm)
  - Ice surface monitoring
  - Lightning
  - Management of LEO satellite constellations (transponder)
  - Cal/Val for Earthshine, NIST

THOUGHTS ON LUNAR WORKSHOP

- ESS agrees with workshop scope, objectives
- ESS members Michael Ramsey, Kamal Sarabandi will serve on lunar sub-panel coordinating committee
- List of recommended invitees initiated – more to come.
- Feb 26 – March 2 dates are OK (hope it doesn't have to take 5-6 days), any location OK

ESS ACTION ITEMS BETWEEN NOW AND SEPT 26-28 MEETING:

- Complete spreadsheet of Earth Observation objectives, provide it to ESMD and SSB
- Work on list of workshop invitees