OPAG
Magnetospheres Subgroup

11 February 2005

Decadal Survey – Where does Magnetospheric Physics Fit In?

- **Processes; How Planets Work**
  - Auroral energetics as input to atmospheres and surfaces (dominant energy input to the high latitudes of giant planets is magnetospheric in origin)
  - Magnetospheric sources/sinks
  - Interactions between parts of the system (planet, satellites, rings…)
  - Atmospheric loss
  - Upper atmospheric chemistry
  - Aurora as a means to probe the atmosphere
  - Response to solar wind input
  - Tie into extrasolar planets, e.g. low-frequency radio emissions
- **The Origin and Evolution of Habitable Worlds**
  - Radiolysis (is the surface endogenic but weathered, or is the surface exogenic or a combination?)
  - Weathering
  - Atmospheric loss
  - Origin of the atmosphere
  - Does radiation hinder life or promote it?
- **Volatiles and Organics; The Stuff of Life**
  - Boundary conditions
  - Atmospheric loss, Atmospheric source
- **Should seek to be more inclusive of Solar and Space Physics Decadal Survey**

Missions

- Flagship
  - **Any** flagship mission should be a system-wide study including fields and particles instruments
  - **Titan Orbiter**: upper atmospheric-ionospheric-magnetospheric coupling; atmospheric loss (requires orbiter)
  - **Europa Orbiter**: Magnetospheric interactions as a source atmosphere, source of magnetosphere, input to the state of the surface, and diagnostic of the interior
  - **Giant Planet Orbiters** Interiors and Atmospheres: Magnetosphere-Ionosphere coupling; Study magnetospheres of planets with large offset and tilted dipole moments
  - **Primitive bodies**
    - Primitive bodies: look for frozen-in magnetic field and escaping volatiles
    - Rings: ring-magnetosphere interactions

Missions, continued

- Outer Frontiers
  - Jupiter polar magnetosphere (Juno)
  - Ganymede orbiter
  - Outer planet aurora (& plasma torii) monitor (UV, IR, radio, …) from Earth orbit
  - Outer planet flyby missions
  - …. More to come

Participants

- Crary
- Paranicas
- Paterson
- Burger
- Kurth
- Smyth
- (Johnson, not present)