

NOSSE and the last Decadal

2003 Decadal NF Mission Options

Recommended Mission candidates (prioritized)

- Kuiper Belt Pluto Explorer
- South Pole-Aitken Basin Sample Return
- Jupiter Polar Orbiter with Probes
- Venus In Situ Explorer
- Comet Surface Sample Return

Additional Missions (not prioritized)

- Network Science (not Mars)
- Trojan/Centaur Reconnaissance
- Asteroid Rover/Sample Return
- Io Observer
- Ganymede Observer

2003 Decadal NF Mission Options

Recommended Mission candidates (prioritized)

- Kuiper Belt Pluto Explorer (NF # 1)
- South Pole-Aitken Basin Sample Return (NF # 2 -phase A)
- Jupiter Polar Orbiter with Probes (NF # 2)
- Venus In Situ Explorer (proposed for # 2)
- Comet Surface Sample Return (proposed for # 2)

Additional Missions (not prioritized)

- Network Science (not Mars)
- Trojan/Centaur Reconnaissance
- Asteroid Rover/Sample Return
- Io Observer
- Ganymede Observer

2003 Decadal Issues

- 5 mission concepts prioritized and well-defined
- Over-definition of mission components?
- 5 additional concepts neither prioritized and various levels of refinement
- Problems when 2 missions selected of original set
- Cost / technology risk rather than science becomes mission selection criteria
- No credit given for enabling later missions (technology demo, etc.), may even be a negative

Kuiper Belt Pluto Explorer

- Fly-by Pluto-Charon
- Reconnaissance of KBOs
- High resolution imaging
- Spectrometry – IR, Vis, UV
- Radio science
- Measurements of particles and plasmas
- Dust detectors

South Pole-Aitken Basin Sample Return

- Sample return
- Aitken Basin – oldest impact basin
- Sample to date impact
- Sample of lower crust / mantle
- 2 static landers with arms

Jupiter Polar Orbiter with Probes

- Polar orbiter
- Atmospheric remote sensing
- Gravity analysis
- Radiometer for atmospheric composition
- Particles and fields measurements
- 3 atmospheric probes to 100-bar level, sample a range of latitudes (mass specs, wind, temperature, clouds, sunlight)

Venus In Situ Explorer

- Atmospheric composition, trace gases, light stable isotopes
- Noble gas isotopic abundance in atmosphere
- Descent, surface and ascent meteo data
- Zonal winds
- IR descent images from 10-km
- Chemistry and mineralogy of a core
- Texture of surface materials to constrain weathering

Comet Surface Sample Return

- Sample return
- Science higher ranked than New Horizons but not as mature
- Surface sample (near vent), nucleus sample if possible
- Cryogenic desirable

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Network Science

- Seismic, heat flow
- Really a lunar network
- Inner structure, distribution of heat producing elements, lateral and vertical heterogeneity of crust and mantle, possible existence of iron-rich core
- Grab bag of science issues that might be addressed

Trojan/Centaur Reconnaissance

- Flyby / reconnaissance
- Imaging, spectroscopy, radio science, other
- Poorly defined in decadal

Asteroid Rover/Sample Return

- Sample return
- Understand geological evolution of asteroids, especially including regolith, and variability vertically and laterally
- Site selection needs reconnaissance, so recommend 433 Eros
- Poorly defined

Io Observer

- Little definition in Decadal
- Tidal heating
- Interior structure
- Magnetic field?
- Eruption processes, tectonics
- Surface chemistry
- Atmosphere

Ganymede Observer

- Little definition in decadal
- Descope from Flagship science
- Intrinsic and induced magnetic field
- Internal structure / metallic core? / deep water ocean / tidal effects
- Cryovolcanism, grooved terrain, etc.
- Non-ice materials?
- Composition and structure of atmosphere

Concerns for this Decadal

- Overdefinition results from study and costing activities
- Innovation a liability rather than a bonus
- Feed forward to later missions (same target or similar technology requirements)
- Cost margins and high TRLs are primary selection criteria rather than science