Exploring the Solar System

10/26/2009
Opening Discussion

- http://www.youtube.com/watch?v=GDS83yrM30Y
- Have you seen anything interesting in the news?
- What did we talk about last class?
- Minute essay
  - Return time on assignments.
  - Newton's formulas. You never had to use G.
Midterm Results

• Distribution of raw grade (no public talk EC)
  • 2 – >100, 2 – 90s, 6 – 80s, 11 – 70s, 14 – 60s, 17 – 50s, 6 – 40s, 6 – <40

• High = 112

• Median = 61

• Curve 15 points

• Should this midterm be open book?
Some Midterm Solutions

• I want to look at solutions to some of the problems on the midterm. The full solution set is available.
Robotic Missions

- Computerized spacecraft are the primary way we get information on the planets.

- Types
  - Flyby
  - Orbiter
  - Lander/probe
  - Sample return mission
Flybys

• Nature
  • Compared to others, this is fast, cheap, and easy.
  • Don't have to carry fuel for slowing down.
  • Only get one chance to take all your data.

• Instruments
  • Cameras
  • Spectrometers
  • Magnetometers
  • Dust detectors
Orbiters

• Nature
  • Stay a while in orbit around a planet.
  • Get to collect a lot more data, but have to have fuel to slow down so they cost more.
  • Good for watching how the planet/moons evolve.

• Instruments
  • Generally the same types as flybys, but these are generally loaded up because of the greater cost.
  • Radar often added.
Lander/Probe

• Nature
  • These actually go into a planet or land on its surface.
  • These give us the closest possible look at things and provide in situ measurements.

• Instruments
  • Cameras
  • Meteorological instruments
  • Microscopes
  • Mass spectrometers
Sample Return Mission

• Nature
  • These missions collect material from another world and bring it back to Earth for study.
  • We have moon rocks returned by Apollo and Russian robotic missions.
  • Stardust brought back dust particles from a comet's tail.

• Instruments
  • These missions aren't about instruments. They collect and return so Earth bound instruments can be used for analysis.
Combo Missions

- Due to the fact that a big part of the challenge with probes is getting to the planet, it is not uncommon to put things together.
- Both Galileo and Cassini included an orbiter with a probe/lander.
Past/Current Missions

- http://www.flickr.com/photos/adamcrowe/4002050558/
- This is an image sent to me by two of you.
- It shows the paths of all past/current space missions.
Minute Essay

- Questions? Feedback?
- I will be posting assignment #3 this afternoon.
- Because we only did two class days on chapter 7 the next reading quiz will be 7 & 8.