

Meeting with Mike Rilee
August 13, 2002

Agenda

- (1) Determine how to accomplish the mission objective.
- (2) Presentation of spacecraft components and discussion of their uses.

Spacecraft components to be discussed are as follows:

Solar Sail

Parts:

- Sail
- Beam (hold solar sail out)
- Actuators (steer it around)

Notes:

- Need to implement a prediction capability for figuring out where steering the sail a particular way will result.
- Create command structure for actuators to decide how to move it a certain way, involving objects, methods, and states.

Main Bus

Parts:

- Mechanical support & fixture
- Power
- Communications

Notes:

- Provide physical structure
- Think of it as what the other components 'plug' into

Observation Platform

Parts:

- Platform
- Truss
- Actuators

Notes:

- Transports/Contains scientific instruments

Power Platform

Parts:

- Platform
- Truss
- Actuators

Notes:

- Power platform will be positioned diametrically opposed to the observation platform, so as to keep radiation from the radio-thermal imager from interfering with the scientific readings.
- Radio-thermal generators component will be positioned on the power platform.

Battery Pack

Parts:

- Battery pack

Notes:

- Stores up energy

Radio-Thermal Generator

Parts:

- Radio-thermal generator
- Plutonium

Notes:

- Utilized as a (secondary?) power source to the solar sails.
- Gives off radiation that may interfere with readings from scientific instruments.

Heating System

Parts:

- Heaters
- Heat conduits
- Radiators

Notes:

- It's cold out there! Outer parts of the asteroid belt are freezing (and not necessarily with water ice)
- Heaters maintain ANTS systems
- Temperature information will be available through simulation model

Star Camera

Parts:

- Star camera

Notes:

- Wide angle lens, captures images of stars
- Utilize patterns in the star maps to set orientation, position information

Sun Sensor

Parts:

- Sun sensor

Notes:

- Senses the location of the sun
- Can be confused by light reflecting off of asteroid/planetary surfaces
- Covered by latest documents provided by Mike Rilee

Multispectral Imager

Parts:

- Multispectral imager

Notes:

- Used to first detect candidate asteroids
- Simulation will add-in realistic stumbling blocks in image data, such as comets, nebulae, and noisy data

Reaction Wheels

Parts:

- Reaction wheels (several)

Notes:

- Used to stabilize spacecraft by spinning and providing counteracting torque forces

X-ray Spectrometer (asteroid observation)

Parts:

- X-ray spectrometer

Notes:

- For gathering information from asteroids in a manner similar to that of the NEAR project
- Operates much like a normal camera conceptually; button pressed down, shutter opens, data flows in and is recorded, button released, shutter closes, and one observation is completed

X-ray Spectrometer (solar monitoring)

Parts:

- X-ray spectrometer

Notes:

- Used to check for the occurrence of solar flares, etc. in a manner similar to that of the NEAR project
- Data for asteroid observation and solar monitoring will be delivered/received in the same package

Radio Frequency Transceiver

Parts:

- Radio frequency transceiver

Notes:

- Be conscious of how much information/data you will be sending back and forth
- In project/simulation, communications will be abstracted to some degree so that handling wave-forms will not be necessary
- Response from communications in simulation will be a communications link sort of object with particular properties

High Gain RF Antenna

Parts:

- High-gain RF antenna

Notes:

- Utilized in long range communications

Low Gain RF Antenna

Parts:

- Low-gain RF antenna

Notes:

- Utilized in short range communications

Transponder Beacon

Parts:

- Transponder beacon

Notes:

- Utilized in communications

Persistent Store

Parts:

- Persistent storage device

Notes:

- Utilized to store monitoring, science, and engineering data/information, as well as other system data such as thermal readings or angle information for the different actuators

Volatile Store

Parts:

- Volatile store

Notes:

- Utilized as temporary data storage

Computer

Parts:

- Computer

Notes:

- The core of the spacecraft