

Generation-X

Introduction

John Martin

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Summary

- ◆ **Thermal gradients and mechanical stability are major concerns for this mission:**
 - Thermal requirements drive the whole spacecraft design
 - Stability between detector and lens (mirror assembly) during operations is a major concern
- ◆ **Two options for observatory deployment:**
 - Assemble and test components at Space Station before sending to L2, with minimal robotic deployment
 - ELV launch directly to L2 with robotic deployment of major components
- ◆ **Technology development in next 10 years will influence many of the design trades we considered**





Headlines

◆ System - Dave Everett

- Thermal requirement on the lens (mirror assembly) drives the whole spacecraft design

◆ Mechanical - George Roach

- Volume and mass can be accommodated
- Mechanical stability during operations is a major concern

◆ Thermal - Eric Grob

- Novel thermal baffle is needed to keep thermal gradients in the lens (mirror assembly) to acceptable levels

◆ Reliability & Safety - Dick Bolt

- Reliability of 4 spacecraft constellation for 5-year life requires very high reliability design of individual spacecraft

◆ Flight Dynamics - Marco Concha

- High thrust engine needed to get to at least GEO altitude
- Low thrust engine, if used for whole trip, will take "forever"





Headlines

◆ Propulsion - Mark Underdown

- Technology development of higher thrust electric propulsion would be very helpful
- Hybrid combination of chemical and electric propulsion seems most desirable; wait ~10 years to determine optimum mix

◆ Attitude Control - Aprille Ericsson-Jackson & Dave Olney

- Spinning the lens is unreasonable
- Detector mass on 100 m mast makes attitude management interesting

◆ Power - Diane Yun

- Requirements can be met, major concerns:
 - 10 kw for first 24 hours to power high thrust electric propulsion
 - 100 m mast may dictate separate power subsystems for detector and main spacecraft

◆ Data System - Ron Vento

- Data receipt can be handled by either DSN or commercial network
- Ranging requirement may demand DSN support

