

K. Ryan 03 System Desc

12011



Terrestrial Planet Finder Mission

TPF Coronagraph Minimum Mission Design Review System Description

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28 Aril 2004

TPF

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Origins
Mission



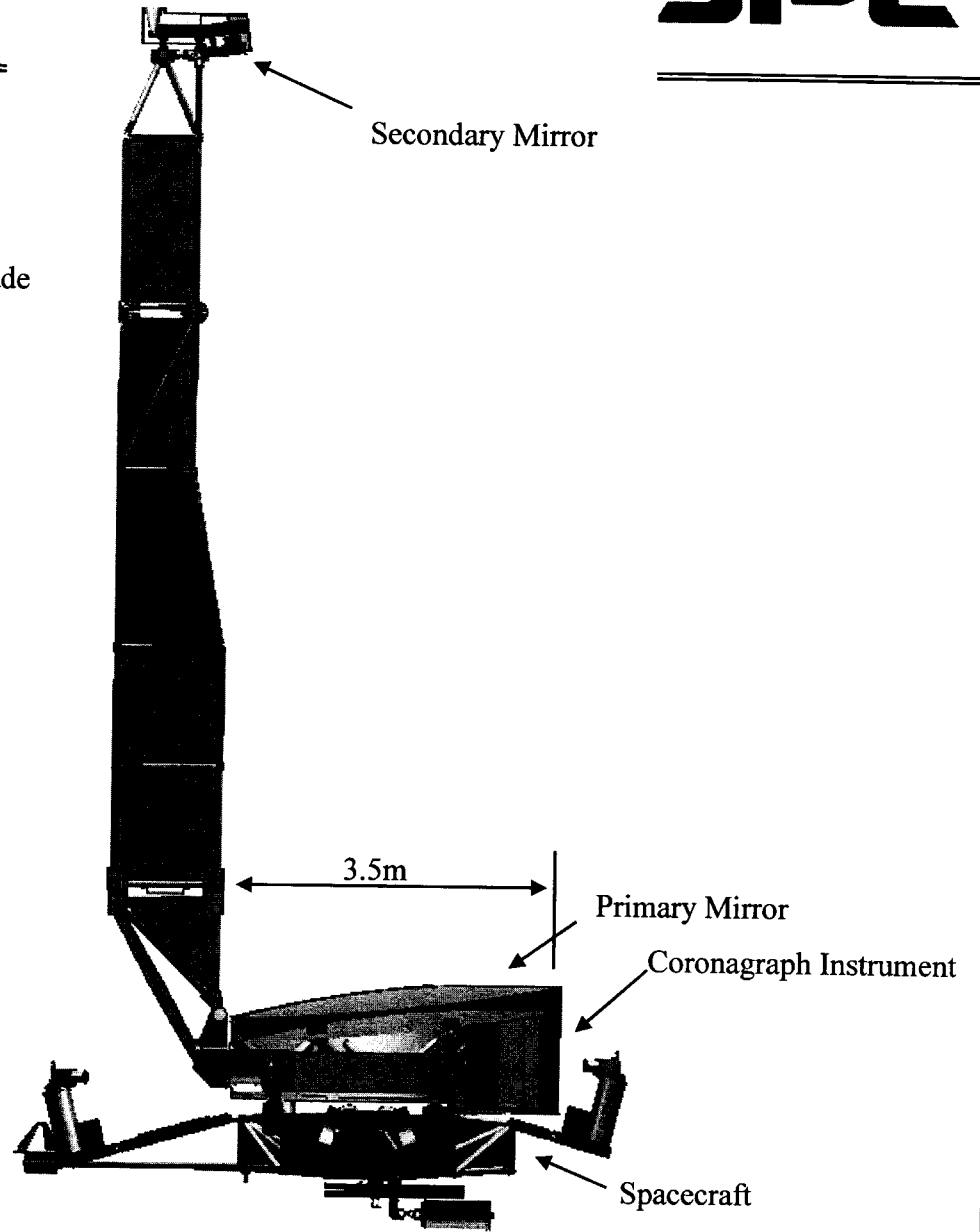
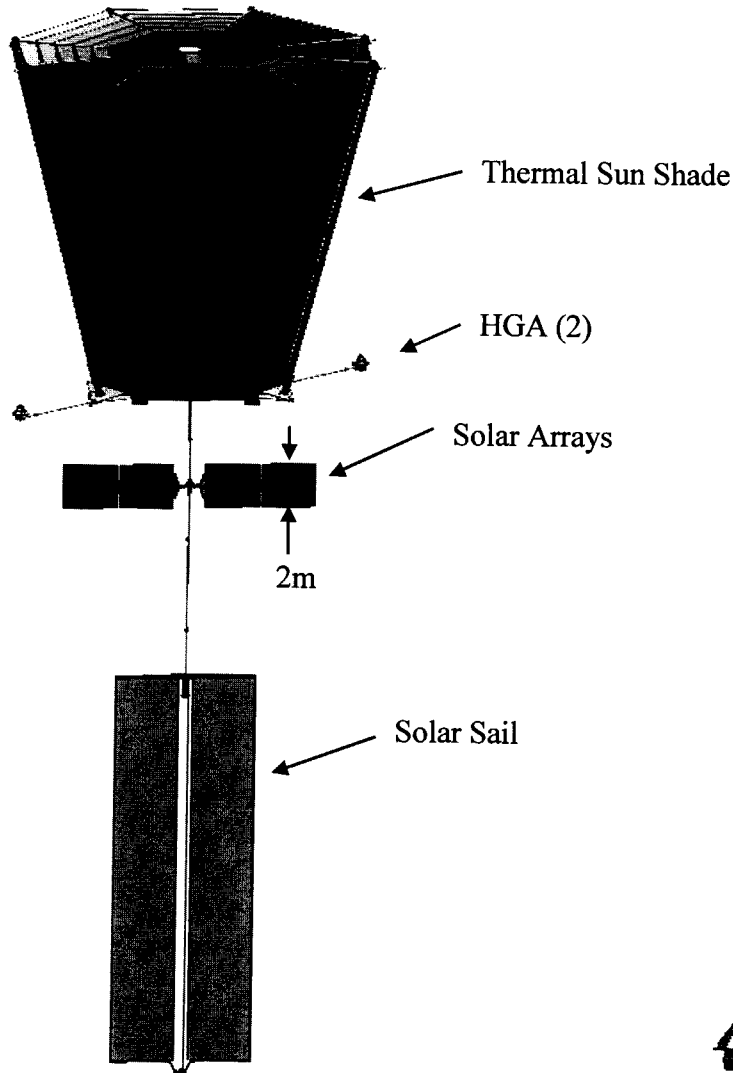
Configuration Overview



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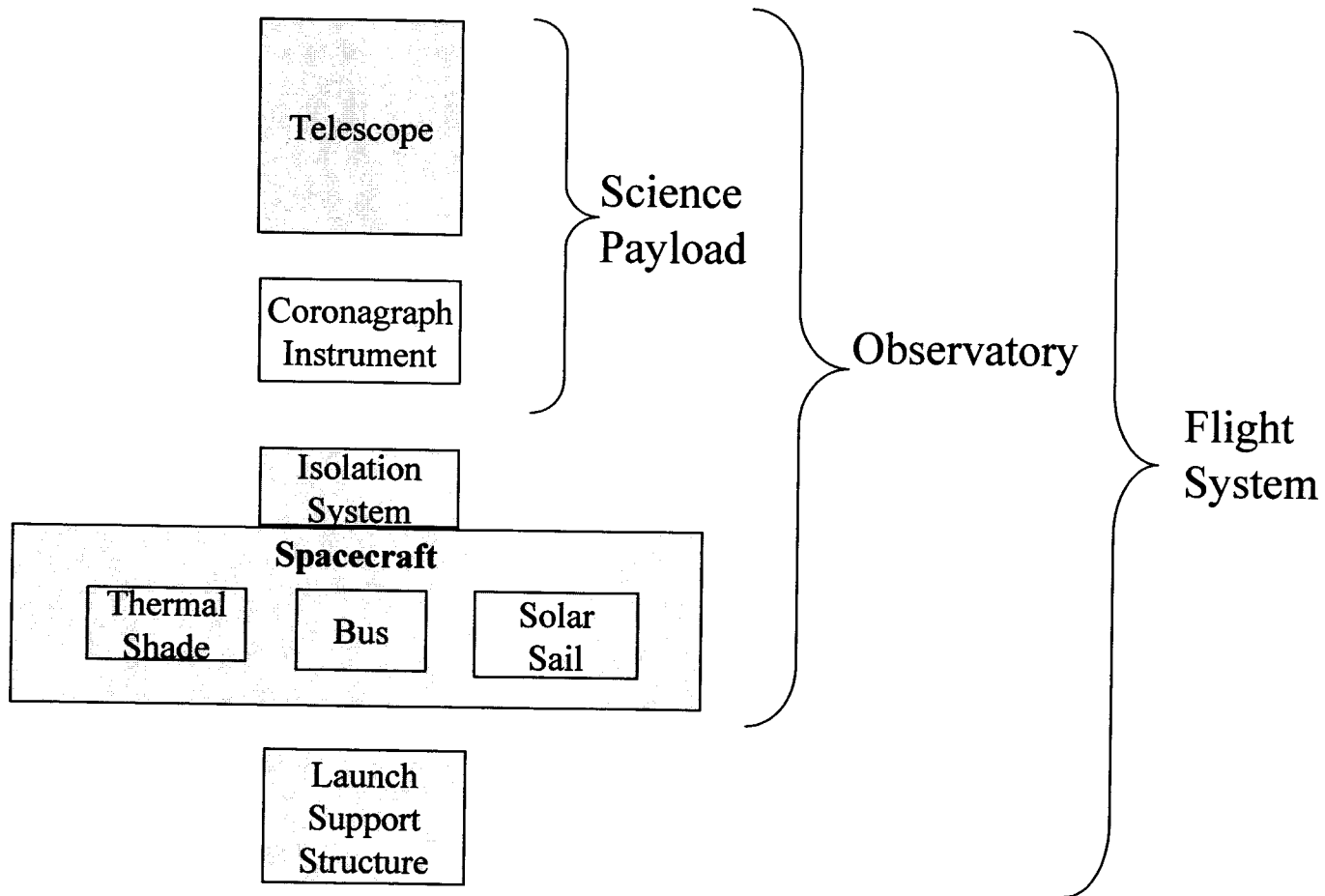
Hardware Nomenclature



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Mission Overview



Terrestrial Planet Finder Mission

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- 2014 Launch Date
- Earth Drift-Away orbit (ala SIRTf)
 - 0.1AU/yr average earth separation rate
 - No cruise phase to operating orbit
- Delta-IVH launch vehicle with 5m x 19m fairing
 - 10,000 kg lift capacity to C_3 of 0.4
- 5 year primary mission duration with consumables for 10 years
 - 6 month post-launch checkout and calibration
 - Planet search phase spans 3 years
- X-Band communications to 34m DSN
 - Continuous link capability
 - Hi Rate science downlink concurrent with science collection
 - Capability to downlink 3 days of stored data (~2Gb per day) in 1 8hr pass

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Spacecraft Overview



Terrestrial Planet Finder Mission

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- Power: 3,000W solar array
- Propulsion: 100kg Hydrazine in Blow-Down Mode
 - No ΔV required
 - Provide safe sun point and some momentum management (solar sail is prime)
- Attitude Control: 3 axis stabilized
 - Star-trackers, gyros, sun sensors, plus instrument provided Acquisition Camera
 - 6 Reaction Wheels (Ithaco E Wheels)
 - Solar Sail with 1 axis articulation for balancing solar pressure torques
- Telecommunications: 256 kbps science downlink
 - X-Band transponder
 - 50W amplifier
 - 2 30dB HGAs with 2 axis articulation
- Thermal Control: V-Groove sun shade to isolate telescope and instrument from sun

System Block Diagram

