



STEREO

Structural Analysis and Test



STEREO Structural Analysis & Test Status

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Preliminary Spacecraft Design Requirements

Weights

Preliminary Launch Environments

Testing Philosophy

Proposed Spacecraft Mechanical Verification Testing

Jitter



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Testing Philosophy

Protoflight test program

No engineering model of spacecraft

Qualification levels (max expected +3dB) at acceptance duration

Load testing and sinusoidal vibration test combined

**Sine input levels increased over small bandwidth
to reach protoflight level**

**Load/sine vibration and random vibration testing performed
on instruments and spacecraft components at “box” level**

**Instruments are qualified prior to observatory integration
Random vibration test to simulate acoustic response
of spacecraft panels**



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Proposed Spacecraft Mechanical Verification Testing

Component vibration testing at APL

Combined component tests if possible, generally 1 day/component

Spacecraft vibration testing at APL

Two spacecraft tested in series, estimated test time of 2 weeks

Mass property measurements and spin balance at GSFC

Two spacecraft tested in series, estimated test time of 6 days

Acoustic and Shock testing at GSFC

Two spacecraft tested in series, estimated test time of 3 days

Spin balance at KSC if required

Two spacecraft tested in series, estimated test time of 2 days



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Jitter

SCIP jitter requirement

1.5 Arc Sec, 0.1 Hz to TBD

**Primary spacecraft modes are likely to fall in this range
(depending on “TBD”)**

Source of jitter is reaction wheel assembly

**Assembly has been located at some distance from SCIP
to help dissipate inputs to SCIP**

**Vibration isolation of either wheel assy or SCIP is possible but not preferred
Isolation systems are custom designs, which could be costly**

**Prefer either acceptance of jitter at spacecraft fundamental modes
or limiting wheel speeds to those that will not excite
spacecraft modes**