

**Astrophysics Experiment for Grating and Imaging Spectroscopy (AEGIS)**  
**Requirements & Characteristics Summary**

rev 9/30/2011

Parameter	Value		Units	Remarks
<b>Science Requirements</b>	Requirement	Goal		
Effective Area @ 0.5 keV	1000	1500	cm <sup>2</sup>	from IXO; other energies should be spec'ed
Resolving Power, 0.3 - 1 keV	3000	4000	none	from IXO
Mission Duration	3	5	years	
Total Mission Observing Time	40	120	Msec	Reqt: 3 years, LEO, 43% efficiency; Goal: 5 years, LEO, 80% efficiency. These are 2- and 6x IXO grating time allocation, respectively.
TOO response time Field of Regard	tbd 24	tbd 1	hr	typical; TBR 90% of sky twice in each year
<b>Implementation Characteristics</b>	Current Best Estimate			
<b>Mirror</b>				
Focal length	4.4		m	Est. max available in Taurus fairing; increase for more area?
Diameter	1.9		m	Est. max available in Taurus fairing
Collecting Area	5500-6000		cm <sup>2</sup>	Rough estimate, Zhang/Heilmann
Angular resolution on axis	10		arcsec HPD	AXSIO baseline
<b>Grating Spectrograph</b>				
Max azimuthal span per grating assembly	30	deg		Driven by resolving power
Grating Period	200 & 230	nm		One of each periodon diametrically opposed sectors
Grating Blaze	3	deg		3.5 deg would trade Area > 1 keV for resolving power
No of CCD Cameras	4			3 for dispersed spectrum; 1 for 0th order
CCDs per camera (dispersed spectrum)	8			in 2x4 chip array; each camera serves 2 spectrographs (4 grating assemblies)
CCDs per camera (0th order)	1			

<b>Implementation Characteristics (cont'd)</b>	Value	Units		
	Current Best Estimate			
CCD Characteristics: Format pixel size array size	1k x 1k 24 25x25	microns mm x mm		CCID41 per Suzaku, IXO
Pointing Control: Acquisition	30	arcsec		
Pointing Control: Drift	< 1	arcsec/sec		
Pointing Knowledge	~1.3 (3xRMS per axis)	arcsec		TBR; degrades resolving power by ~5%
<b>Mass (notional)</b>				
Mirror	230	kg		rough guess, W. Zhang
Gratings	25	kg		scaled from IXO
Readout (incl. electronics)	70	kg		scaled from IXO
Optical Bench	60	kg		rough guess, W. Zhang
Misc	40	kg		
Payload Total	425	kg		
Spacecraft	425	kg		WAG
<b>Total mass</b>	850	kg		CBE
<b>Power (CBE)</b>				
Mirror (thermal control)	350	W		scaled from IXO
Gratings	0			parasitic on mirror
Readout (incl. electronics)	75	W		assumes passive cooling; for active cooling add ~75W
Optical Bench	tbd			thermal control
Payload Total	425-500	W		for passive/active cooling
Spacecraft	tbd			
<b>Total Power</b>	tbd			
<b>Telemetry/Data Handling</b>				
Science data	128	kbit/s		average; peak 10x higher for 6 hrs/mo
Payload HK	2	kbit/s		
S/C HK	tbd			
Data Storage	tbd			> 1 day at average rate
Uplink	tbd			expect 25% of IXO rate
Note: All values listed are CBE. Require growth allowance of 30% on mass and power.				