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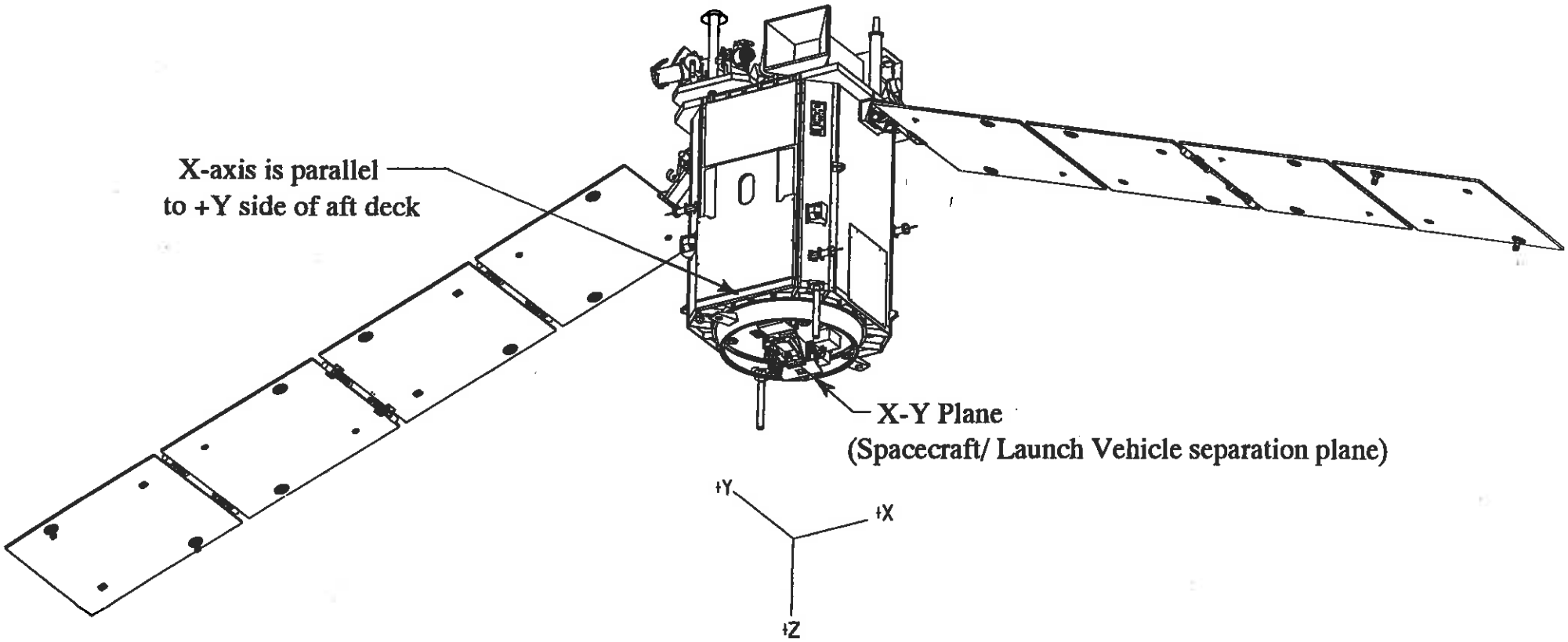
TIMED SPACECRAFT COORDINATE SYSTEM DEFINITION



ACS-2A

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TIMED SABER Instrument Alignment Errors

Initial Alignment Error Sources:	Alignment Errors (degrees) Roll	Pitch	Yaw
Spacecraft Structure as referenced in Spacecraft Master Cube	.0047°	.0047°	.0025°
Mapping SABER Instrument Cube into Spacecraft Master Cube	.0004°	.0004°	.0006°
Spacecraft Structure Errors	(0.010"/24.4")	(0.005"/30.5")	(0.010"/30.5")
Geometric Tolerancing	= .0236°	= .0094°	= .0189°
Thermal distortion (15°C x 24 μin/in/°C = 0.022"/62" ht.)	.0272°(46"w.)	.023°(54.5"w.)	.0042°
1g-0g Transition and Launch Stress Effects	.0083°	.0083°	.0028°
Total Alignment Error from Spacecraft Sources (rss)	.037°	.027°	.020°
Mapping SABER Boresight into SABER cube	TBD	TBD	TBD
SABER Instrument Internal Misalignment	TBD	TBD	TBD
Total Initial Alignment Error (0.050° rss Spacecraft + TBD° Instrument)	.037°+TBD	.027°+TBD	.020°+TBD

(Total Alignment Error Allocation = {0.9° Roll + 1.05° Pitch + 1.05° Yaw}
= Initial S/C Errors + SABER Instrument Initial Misalignments + {Attitude Control Bandwidth =0.5°}
= {0.1° Roll + 0.25° Pitch + 0.25° Yaw} Initial Spacecraft + 0.3° R,P,Y Instrument + 0.5° R,P,Y Attitude Control}

Boresight Knowledge (Pointing) Error Sources:	Roll	Pitch	Yaw
Spacecraft Structural Distortion			
Thermal distortion	.0272°	.023°	.0042°
1g-0g Transition and Launch Stress Effects	.0083°	.0083°	.0028°
Mapping SABER Instrument cube into Spacecraft Master Cube	.0004°	.0004°	.0006°
(2) Star Camera & Gyro Attitude Determ. Error @ S/C master cube (rss)	.0128°(.0103°)	.0134°(.0114°)	.0027°
Total Pointing Error from Spacecraft Sources (0.041° rss)	.031°(.0303°)	.0279°(.027°)	.0057°
SABER Instrument Structural Distortion;			
Thermal Distortion	TBD	TBD	TBD
1g-0g Transition and Launch Stress Effects	TBD	TBD	TBD
Mapping SABER Instrument Boresight into SABER Cube	.0006°	.0006°	.0008°
Total Boresight Knowledge (Pointing) Error w/(2) Star cameras,	.0303°+TBDrss	.0269°+TBDrss	.0058°+TBD rss

Pointing Error Allocation = 0.10° rss Spacecraft + 0.1°rss Instrument Total Error = 0.041° + TBD rss

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TIMED Spacecraft Instrument Alignment Summary

Instrument Name	Spacecraft Resource Requirements Tables: Mechanical Requirements — Placement Error	Mechanical Requirements — Knowledge Error	Attitude & Navigation Requirements — Attitude Control Error	Attitude & Navigation Requirements — Attitude Knowledge Error	Attitude & Navigation Requirements — Pointing Knowledge Error	Budgeted Spacecraft — Initial Placement Error	Budgeted Spacecraft — Initial Pointing Error
GUVI	±1.0°	±0.05°each axis	1.0° each axis, 3σ	0.03° each axis, 3σ	0.25°each axis, 3σ	0.081° R 0.193° P 0.130° Y = 0.25°rss	0.0317°,1σ 0.0281°,1σ 0.0057°,1σ 0.043°rss,1σ
SABER	±0.1° Roll, ±0.25° Pitch ±0.25° Yaw	±0.01°	0.5° each axis, 3σ	0.03° each axis, 3σ	0.10° each axis, 3σ	0.037° R 0.027° P 0.020° Y = 0.050°rss	0.0303°,1σ 0.0269°,1σ 0.0058°,1σ 0.041°rss,1σ
SEE	±1.0°	±0.05°each axis	1.0° each axis, 3σ	0.03° each axis, 3σ	0.05°each axis, 3σ	0.040° R 0.030° P 0.010° Y = 0.051°rss	0.0103°,1σ 0.0114°,1σ 0.003°,1σ 0.016°rss,1σ
TIDI	±0.5°	±0.05°each axis (2 arc sec. map)	1.0° each axis, 3σ	0.03° each axis, 3σ	80 arc sec Az,1σ 100 arc sec El,1σ (=0.019°R,P; 0.022°Y)	0.05° R 0.05° P 0.033°Y = 0.078°rss	0.0138°,1σ 0.0144°,1σ 0.010°,1σ 0.022°rss,1σ
						(Includes S/C & Instrument Errors)	
TIMED S/C will have Attitude Knowledge Error = Attitude Control Error < 0.5°, 3σ				0.010° Roll,1σ 0.011° Pitch,1σ 0.003° Yaw,1σ = 0.016°rss,1σ	0.016° Roll,3σ 0.018° Pitch,3σ 0.005° Yaw,3σ = 0.025°rss,3σ		