RSDO CATALOG ADVISORY NOTICE

THE RSDO CATALOG SERVES AS A **STARTING POINT** FOR MEETING YOUR SPACECRAFT REQUIREMENTS. THE RSDO CATALOG SPREADSHEET IDENTIFIES THE HERITAGE (**PROVEN DESIGN**) MISSION CONFIGURATION ONLY OF EACH SPACECRAFT LISTED. THE HERITAGE MISSION CONFIGURATION IS ONLY **ONE OF MANY** CONFIGURATIONS THAT EACH SPACECRAFT IS CAPABLE OF ACHIEVING.

TO LEARN MORE ABOUT THE FULL CAPABILITY OF EACH RSDO SPACECRAFT, PLEASE CONTACT THE RSDO AT **RSDO@GSFC.NASA.GOV** OR 301-286-1289.

PLEASE ADVANCE TO PAGES 2 AND 3 TO REVIEW THE RSDO CATALOG SPREADSHEET.

	Rapid II Summary	Units	Astrium Flexbus	Ball Aerospace BCP 600	Ball Aerospace BCP 2000	Lockheed Martin LM 900	Orbital LeoStar-2	Orbital MicroStar	Orbital MidStar	Orbital MiniStar	Orbital PicoStar	Orbital StarBus
Compatibilty	Payload Power (OAV) (EOL)	W (EOL)	100	125 W with solar array normal to sun except for 15 min/day	730 W with S/C yaw steering of solar array	344, 35% Duty Cycle (based on reference mission)	343 Max, mission specific	50	327.4	25	10	550
	Payload Mass Limit of Bus	kg	100	90	380	470	238	68	780.1	25	20	200
	Bus Dry mass (w/o Payload)	kg	380	203	608	492	166	58.6	580	100	52.7	566.3
	Science Data Downlink capacity	kbps	1000	17,000 (two channels)	320000	Mission Specific	2000	2000	1024	115.2	2 to 100	1000
	Science Data Storage capability	Mbit	2000	2000	134000	Mission Specific	1000	3	2000	32	3.9	n/a
	Pointing Knowledge	arcsec	2063 (Roll), 103 else	12 (3σ); 16 for yaw	3 (3σ)	10	108 x 3	2880	10	540	3600	390
	Pointing Control	arcsec	2063 (Roll), 103 else	13 (3σ); 17 for yaw	5 (3σ)	12	150 x 3	2160	10	720	3600	900
	Pointing Stability (Jitter)	arcsec/sec	n/a	< 4.2 (3σ)	0.045	0.8	1	36	0.055	N/A	720	3.6
	Slewrate	deg/min	n/a	~ 60	~ 240	n/a	60	60	6	N/A	(mission dependent)	15
	Mission Design Life	yrs	5	6	5	6	3 @ .72	3	3	5	1	10
	Compatible LVs	(names)	Rockot, Cosmos, Dnepr	Pegasus XL, Taurus Multiple Manifest	Titan II, Delta II, Athena 2, Taurus, COSMOS SL-8, Long March D	Athena II, Taurus, Delta II	Pegasus Taurus	Pegasus, Taurus	Delta II	Pegasus, Taurus	Shuttle, Delta, Pegasus,Taurus, Ariane	Delta II,Ariane
	Nominal Orbit		500 - 300 km, 89°	600 km 60° inclination	600 km 60° inclination	680 km, 90.5° sun synch	470	580 km 97.75 deg	768 km 25 deg	685 km; 98.13 deg sun synch	370 km 51.7 deg	GEO
	Types of Orbits availible		LEO from 28.5 to 98 deg, up to 800km	450 to 900 km; 0 deg to sun sync inclinations	450 to 900 km; 0 deg to sun sync inclinations	LEO from 28.5 to 90.5 deg, up to 80 km	450 - 1000 km 28 - 110 deg Inclination	LEO All Inclinations 580-1000km	All LEO Orbits	500 to 1000 km; all inclinations	LEO from 28.5 to 51.6 deg up to 900 km	GEO
	External Volume availible for Payload		n/a	111 cm dia tapering to 70 cm dia at height of 101 cm	1m dia x 1.5 m h	2200mm x 1270mm	2336 x 2336 x 2726	1.5 m dia x 1m h	2.75 m dia x 4.4 m h	Taurus APC 75D x 20H Pegasus 76D x 90H (dimensions in cm)	n/a	1 m x 1.8 m x 1.2 m (l x w x h)
	Internal Volume Availible for Payload		n/a	71 cm x 71 cm x 55 cm high	0.91 cm x 120 cm x 101 cm high	780mm x 1010mm in central cylinder. Some volume available in equipment bay	--	Special (additional payload rings added as needed)	n/a	25 cm square on +/- Z sides of payload panel	0.35 m x 0.19 m footprint, 0.18 m high	Two 1.4 m^2 side panels plus one 1.8 m^2 nadir panel
Description	ACS	type	3-axes stabilised	3 axis, Zero-net Momentum	3 axis stabilized	Zero Momentum, 3 axis stablilized	3 Axis zero mom bias	3 Axis Zero Momentum	3 Axis Zero Momentum	spinner	spinner	3 Axis Pitch Bias nadir oriented
	GPS	# recievers	1 redundant	0	2	2	1	1	0	0	0	0
	Batteries	type/Ah	NiH2 / 16 Ah	NiH2 CPV / 20 Ah	NiH2 CPV / 40 Ah	NiH2 / 50 Ah	1 NiH2 / 16 Ah	NiH2/10 Ah	NiCd/80 Ah	NiCd / 8 Ah	NiCd/4 Ah	NiH2/104 Ah
	Arrays	cell type/Area	Silicon, 6.4 m2	GaAs/Ge dual junction / 2.35 m2	GaInP2/GeAs/Ge triple junction / 7.26 m2	GaAs / 2.31 m^2	GaInP2/GaAs/Ge 22.5% 3.0 m^2 fixed petals	Single Junction GaAs 1.57m^2	Single Junction GaAs 7.73m^2	Silicon / 0.71 m^2	Single Junction GaAS 0.39m^2	Silicon 13.1m^2
	Nominal Voltage	V	28	28	28	28	28	14, 5, 28	28	28	28	35/28 (sun/eclipse)
	C&DH Bus Architecture	description	P 1750 Processor, RS 422 Links	HLDC, LLDC, 1553, serial digital	HLDC, LLDC, 1553, serial digital	1553	Distributed MIL-STD-1553B	RS-422 Distributed	1553	RS-422	RS-422 Central	1553 Distributed
	Downlink Formats		CCSDS	CCSDS STDN	CCSDS STDN	STDN	CCDS	STDN,CCSDS	CCSDS,DSN,TDRSS,STDN,LEO-T	NRZ-S	STDN, DSN	STDN,DSN
	Downlink Band		S-Band	S-band	S-band and X-band	S-Band	S Band	S-band	S-band	S-band	S-band	S-band
	Structure	description	Al Honeycomb with CFRP Face Sheets	Rectangular; graphite facesheets bonded to Al honeycomb core	Rectangular; aluminium honeycomb	Al Honeycomb hexagon	Hexagon, Honeycomb	AlBeMet/Al Honeycomb Dual Faced Cyl	Al Honeycomb Trapezoidal	Al and Al Honeycomb Octagon	Al Honeycomb Composite Hexagon	Al/Composite Rectangular
	Propulsion	type	cold gas	none	Monopropellent, Blowdown N2H4	N2H4 blowdown	None	none	none	none	none	Monopropellant Blowdown EHTs/REA
	Propellant Capacity	kg	32	none	33	38.4		none	none	none	none	254
	Max delta V	m/s	40	none	72			none	none	none	none	800
Programmatic	heritage mission(s)	name(s)	Champ, Grace	GEOSAT Follow-On	QuikSCAT	CRSS	OrbView	BATSAT, ORBCOMM	FUSE	ACRIMSAT	MightySat 1	IndoStar
	nominal schedule	mths	36	32	24	36	30	22	27	24	19	30
	Contract Options	1		Battery By-Pass	Battery By-Pass		Add redundcy 6 yrs @ .86	Custom Structal Ring Configartion for Flexible P/L Acc.	Add SSR (128Mb) and X band XMTs (Up to 400 Mbps)	Mission Operations for 2 years	ELV Launch Modifications	Change to 3 Axis Zero Momentum System
		2		Monopropellent, Blowdown N2H4 Propellant System	Larger Propellant Tank		Hydrazine prop 44 kg, 265 m/s	Increase Power Up To 270W	Add GPS Receivers	Deletion of SDMS	Mission Operations	Add R6000 P/L Computer
		3					32 Gb storage, 150 Mbps downlink	Add 1553/1773 P/L Data Interface	Add Propulsion System			Change to X-band XTM (50Mps)
		4					2 years mission operations	Enchanced Data Storage 256Mb	Enchanched Structure For Large P/L			Higher Power Array(2000w) and Batteries(52Ah)
		5					Remove SDMS	Reduced Pointing Accuracy	Operations for 3 years			Add 32 Gbit SSR P/L Data Unit
		6						Add Propulsion Module				
		7						Operations for 2 years				
		8										

	Rapid II Summary		Spectrum Astro	Spectrum Astro	Spectrum Astro	Surrey	Surrey	Surrey	SWALES	TRW	TRW	TRW	TRW
		Units	SA-200B	SA-200HP	SA-200S	MicroSat-70	Minisat-400	SNAP	EO-SB	T100	T200A	T200B	T310
Compatibilty	Payload Power (OAV) (EOL)	W (EOL)	86	650	66	1.5 - 18	100	2.5	256	25	94	175	560
	Payload Mass Limit of Bus	kg	40 ref, 100 Max	666	200	23.8	200	3	150 + 86	36	75	95	550
	Bus Dry mass (w/o Payload)	kg	90	354	129	44.7	206.7	6.5	332	184.1	242.4	278	716
	Science Data Downlink capacity	kbps	2500	80,000 (X-band) 2500 (backup)	2500	2048	2048	38.4 + 76.8	up to 4000	200	1400	2048	1024
	Science Data Storage capability	Mbit	2048	100,000	2048	2048	3072	24	1800	16.7	2000	2000	1400
	Pointing Knowledge	arcsec	317	0.5	2.8	1800	72	3600	36	694	360 - R/P, 324 - Y	6 - R, 2 - P/Y	43 roll & pitch 86 yaw
	Pointing Control	arcsec	360	16	32	1800	360	< 18,000	30	833 - R/P, 2777 Y	1080 - R/P, 1440 - Y	72	47 roll & pitch 87 yaw
	Pointing Stability (Jitter)	arcsec/sec	360 (18)	0.1	0.1	20	20	18	0.3	unknown	18 arcsecs per 0.1sec above 3 Hz	Roll 3.6 arcsec/sec; Pitch/Yaw 7.2 arcsec/sec	3.6 roll 7.2 pitch & yaw
	Slewrate	deg/min	240	120	390	300	300	12	15 - 60	300	120	20	21
	Mission Design Life	yrs	1 @ .76	4	2	3 @ .85	1	1 @ .8	1.5 @ .88	3	4	3	9
	Compatible LVs	(names)	Minotaur, Pegasus, Taurus, Athena, Delta, Titan-II, Atlas	Taurus, Athena I, Athena II, Delta II series, Titan II, Atlas	Pegasus XL, Taurus, Athena, Delta, Titan II, Atlas	Cosmos-3M,Ariane-4, Delta, Athena, OSP Minataur, Taurus, Zenit, Dnepr, Tsyklon	Dnepr, SS-18, Taurus, Athena, Delta II, EELV, Eurockot, Ariane-5, Cyclone, Zenit	Cosmos-3M, Ariane-4, Athena, Cyclone, Delta II, Delta III, EELV, Zenit, Dnepr	Delta	Standard Pegasus	Athena 1	Athena 1, Athena 2, Taurus, Delta 7320	Delta, MLV, ILV
	Nominal Orbit		55 km, 28.5 deg	600 km circular at 28.5 deg	425 km 97.1 deg Sun Synch	700 km, sun synch	650km, 65deg	700 km, 98 deg	400-900km, 98.8 deg	750 Circular Sun Sync.	600 circular	600 +/- 50 km circular sun sinc.	GEO 3.6 to 5.4 deg
	Types of Orbits availible		All sun synch, all LEOs @ modified PL duty cycle	LEO circular (nominal); many other orbits available	Sun-Synchronous (twilight); other available	400-1400km, all inclinations	400-1400km, all inclinations	400-1400km, all inclinations	0-99 deg inclinations	N/A	Any LEO 250 to 1000 km, any inclination	Any LEO (250 to 1000 km) any inclination	Any GEO LEO 250 -1000 km, any inclination
	External Volume availible for Payload		.71 x .38 x 1.20 m	2.06 m wide x 1.12 m deep x 2.40 m tall (Taurus XL)	1.12 m wide x 0.95 m deep x 1.25 m tall (baseline Pegasus XL fairing)	.3 x .3 x .2	250mm x 1000mm diameter	Mission Dependent	1.000 x .75 x 1.50 m	6.114 cubic feet on the top of the spacecraft structure	80" diameter to LV fairing, 12.7 ft^3	11.81 sq.ft x 80.9 in	1145 x 1145 x 1424 mm (X x Y x Z)
	Internal Volume Availible for Payload		Slots for up to 7 6U VME cards	100 cm dia x 75 cm tall	Slots available for up to four (4) 6U VME Cards	.11 x .28 x .28 m Earth observation compartment and .078 x .35 x .35 for 3 payload module trays	8bays, 0.18m², 0.03m ², 6x 0.01m²	3 module boxes, central bay	280 x 232 x 180	N/A	N/A	3 bays, 2.43 sq.ft.each	0.61 m^3
Description	ACS	type	3-Axis zero momentum bias, wheels, mag tqs	3-Axis zero momentum bias/thruster-based management	3-Axis zero momentum bias/magnetic management	3 axis zero bias, 3 wheels, mag tqs	3-axis /ZM	3-axis momentum bias, 1 wheel, mag tqs	3-axis zero momentum bias, 3 wheels, mag tqs	Pitch-momentum bias	Pitch momentum biased three axis control	Zero Momentum, 3-axis control, stellar inertial	Zero momentum bias, 3-axis control, stellar-inertial
	GPS	# recievers	Option #3	0	1	1	12 channel, 2 antennas	1	1	0	1 (internally redundant)	2 (1 redundant)	n/a
	Batteries	type/Ah	NiCd / 4 Ah (3)	Two NiH_2/50 Ah each	One NiH_2/15 Ah	NiCd / 7 Ah	NiCd/20 Ah	NiCd / 1.4 Ah	NiCd / 50 Ah	NiCad / 9	Super NiCad / 21	Nickel-Hydrogen / 23	NiH2 / 65 A-h
	Arrays	cell type/Area	Si, 2.54 m^2	Triple Junction $GaInP_2$/GaAs/Ge 10.32 m^2	Dual Junction $GaInP_2$/GaAs/Ge 1.62 m^2	Ga As, 0.7 m^2	Single Junction GaAs, .5m^2	Ga As, 0.16 m^2	Hi ETA Si, 1860 & Ga As, 5.25 m^2	5796 N-on-P Silicon Cells / 3.75 sq. m.	Silicon 1710 x 2 / 2 wings -Total area = 5.71 meters	Silicon / 7.06 Sq.meters	High Eff Silicon / 427 m^2
	Nominal Voltage	V	28	28	28	5V regulated and 14V unregulated	28	8	28	28	28	28	28
	C&DH Bus Architecture	description	RS422, 1553	VME-based 32-bit RISC processor	VME-based 32-bit RISC processor	RS232, RS422, RS485	RS422/485 and CAN	CAN, RS232, RS422	1773 / RS422	80C86 bus Central Processor	1553 and a 80C86 bus, Central Processor	1553 and a 80C86 bus, Central Processor	1553 & RS-422
	Downlink Formats		CCSDS	CCSDS: STDN/DSN	CCSDS: STDN/DSN	CCSDS	CCSDS	Custom	CCSDS-701	STDN	NASA/STDN & ESA	GSTDN / DSN	SGLS
	Downlink Band		S-Band	X-band and S-Band	S-Band	S-Band	S-band	S-Band	S-Band	S-band	S-band	S-band	S-band
	Structure	description	Rectangular. Al Honeycomb	Octagonal, Al space frame construction with honeycomb	Al half-frames forming a honeycomb configuration	Rectangular. Al honeycb stacked trays.	Al Honeycomb Nine sided prism	3 side prism. Al + Al/Al honeycomb	Hexagon, Milled Al	Hexagon / Aluminium	Hexagon/ aluminum	Hexagonal Composite vertical and Aluminum horizontal panels	Rectangular; Composite & aluminum
	Propulsion	type	None	Blowdown hydrazine system	Blowdown hydrazine system	None	N2, 10 thrusters @ 0.1N	Liq. Butane, self press.	None	monopropellant hydrazine blowdown system	Monopropellant blowdown hydrazine system	Monopropellant blowdown hydrazine system	Bipropellant
	Propellant Capacity	kg	None	67 kg	21.3 kg	None	5.3	0.033	None	73	73	Nominal 45, max 80	893 kg (equal split fuel & ox)
	Max delta V	m/s	None	131	192	None	15	3	None	548	352		1784
Programmatic	heritage mission(s)	name(s)	MightySat II.1	New Millennium Deep Space 1	MSTI-1, MSTI-2, MSTI-3	Tsinghua-1	UoSAT-12	SNAP-1	EO-1	TOMS-EP	ROCSAT	SSTI Lewis	GeoLITE
	nominal schedule	mths	37	36	36	19	18	12	37	18	21	24	26
	Contract Options	1	Full redundancy	Full Redundancy	Deployed Gimbaled Arrays	None	Enhanced Power	Cameras & Machine Vision System	High data: 105 Mbps, 50Gb, Xband	Remove Propulsion	Fine Pointing	Increase PL Mass and Power	Low Earth Orbit option
		2	High data: 80 M down, 32 G storage	Deep Space Configuration	Full Redundancy		Resistojet propulsion sub-system	UHF receiver	N2H4 60 m/s delta-V & RCS			GEO Modifications	
		3	GPS (1)	Electric Ion Propulsion	Full Redundancy & Deployed Gimbaled Arrays				Change 1773 bus to 1553				
		4	Ground segment integration support	Electric Ion Propulsion and Deep Space Configuration	High Rate Data								
		5		Grond Segment Integration Support	Ground Segment Integration Support								
		6		GPS and Magnetics									
		7											
		8											