

RSDO CATALOG ADVISORY NOTICE

NOTE THE FOLLOWING!

THE SET OF RAPID III CATALOG SPACECRAFT PARAMETERS SERVE AS ONLY A STARTING POINT FOR MEETING YOUR MISSION SPACECRAFT REQUIREMENTS.

THIS RSDO CATALOG SPREADSHEET IDENTIFIES THE CHARACTERISTICS OF EACH CATALOG SPACECRAFT IN THE CONTRACT BASELINE CONFIGURATION.

THE CONTRACT BASELINE CONFIGURATION IS ONLY ONE OF MANY POSSIBLE MISSION CONFIGURATIONS.

EACH SPACECRAFT IS CAPABLE OF BEING MODIFIED TO HAVE OTHER MISSION SPECIFIC CAPABILITIES.

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

THIS FILE IS INTENDED TO BE PRINTED ON THREE 11 X 17 INCH PAGES.
ONE PAGE CONTAINING THESE NOTES AND TWO PAGES FOR THE CATALOG DATA TABLE. THE TABLE SHOULD FIT ON TWO PAGES. PLEASE ADJUST YOUR PRINTER SETTINGS AND PAGE BREAKS AS NEEDED.

ALSO NOTE: SOME SPREADSHEET CELLS HAVE IMBEDDED COMMENTS INDICATED BY RED CORNER MARKS.
HOWEVER, COMMENTS ARE ONLY VISIBLE IN THE EXCEL VERSION AND WHEN THE FILE IS DISPLAYED ON-SCREEN.
PLACE CURSOR ON THE CORNER MARKS TO READ.

PLEASE ADVANCE TO PAGE 2 AND 3, TO REVIEW THE CHARACTERISTICS OF RSDO RAPID III CATALOG SPACECRAFT.

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Parameter	Contractor >> Spacecraft Name >>		Ball Aerospace	Lockheed Martin	Lockheed Martin	Northrop Grumman	Orbital	Orbital
	Units		BCP2000	LMx	LM400	Eagle 0	300S	300HP
Compatibility	Orbit Average Payload Power (EOL)	W (EOL)	400	427	409	100	125	775
	Maximum Payload Mass	kg	500	460	75	Panel: 86 Axially: 3000	65	3,000
	Bus Dry mass (w/o Payload)	kg	450	426	186	471	272	1,169
	Science Data Downlink	kbps	80,000	mission-specific	mission-specific	1,000	40,000	40,000
	Science Data Storage (Capacity)	Mbit	56,000	mission-specific	mission-specific	0 (up to 384 Gbits can be added - see comment)	160,000	160,000
	Pointing Knowledge	arcsec	10.5	60 (3s)	413 (3s)	1,550 (3s)	5 (1s)	6 radial (1s)
	Pointing Control	arcsec	10.5	130 (3s)	462 (3s)	1,550 (3s)	120 (1s)	120 (1s)
	Pointing Stability (Jitter)	arcsec/sec	0.5	20 (3s)	5 (3s)	12	1.5	1
	Slew rate	deg / min	18	23	44	90	3 deg/sec	0.125 deg/sec
	Mission Design Life	years	5	3	3-Jan	1	2	5
	Compatible LVs	(names)	Delta II, EELV, Taurus XL, Taurus 2, Falcon 9, Minotaur IV	Taurus 2, Delta II, Falcon 9, Minotaur IV, EELV	Pegasus XL, Minotaur I & IV, Taurus XL & II, Delta II, Athena II, Falcon 9, EELV	EELV, Falcon 9, Taurus II	Minotaur I, Taurus, EELV	EELV, Delta, Taurus II
	Nominal Orbit	Altitude, Inclination, Type, Other	600 km, 94 deg all-Beta	681 km, 98 deg, Sun Synch	LEO 400-1000 km, 0 deg to Sun-Sync, Lunar	Lunar Impactor	425, 97.128, Sun Synch, Asc note at the terminator	565, 25.6, all
	Types of Orbits Available	as needed	LEO 400-900 km 0 to 108 deg	LEO 400-1,000 km 0° to Sun Synch	LEO 400-1000 km, 0 deg to Sun-Sync, Lunar	LEO (28-90° incl & altitudes from 425 km to 1,000 km), GEO, and interplanetary.	As needed with impacts to other parameters.	As needed with impacts to other parameters.
External Payload Volume	meters	1.5-m hex (tip-to-tip) x 2.2-m height (3.5 m3)	1.9 m dia x 1.8m h (ATLAS V 4m LPF)	0.6 x 0.66 x 0.3 h 0.338 x 0.7 x 0.4 h	0.42 m x 0.76 m x 0.31 m (X x Y x Z)	0.762 dia x 1.143	1.828 x 1.828 x 1.4	
Internal Payload Volume	meters	negotiable	1 bay, 0.3 m3	0.07 m3	N/A	32 x 22 x 23 cm, 6 6U cPCI PL I/F slots	35.6 x 71.1 x 30.48 cm to external panel	
Description	ACS	type	stellar inertial zero net momentum	Zero momentum, 3-axis stabilized	Zero momentum, 3-axis stabilized	3-axis stellar inertial w/ thruster-based control	3 axis ZMB, megnetic desat	3 axis ZMB, megnetic desat
	Star Trackers	# of STs	2	2	1	1	1	3
	GPS	# receivers	2	mission-specific	mission specific	0	1	2
	Batteries	cell type/capacity (Ah)	Li-ion / 66 Ah	Li-ion, 60 Ah	Li-ion, 30 Ah	Li-ion / 24 Ah (4 batteries * 96 Ah)	NIHZ/16	NIHZ/125
	Solar Arrays	cell type/Area (m2)	Triple Junction GaInP ₃ , 7.3 m ²	Triple Junction GaAs	Triple Junction GaAs, 3.87m2	ATJ triple junction solar cell with monolithic diode, 3.2 m2	Triple Junction GaAs, 2.7	ATJ GaAs, 16
	Main Bus Voltage Range	volts	24 - 35	28-33	23-33 (28V nominal)	22-34 (28V nominal)	25-34	25-34
	C&DH Bus Architecture	description	Rad750 single board computer based	Centralized processor control, 1553B & RS-422 connections	Centralized processor control, Discrete I/O, 1553B & RS-422 connections	Central processor with RAD750, modular with cPCI and serial 1553 backplane	cPCI, 1553, LVDS	cPCI, 1553, LVDS
	Downlink Formats	CCSDS, STDN, etc	CCSDS, STDN	CCSDS, STDN	CCSDS or JPL type, STDN, DSN, SGLS, TDRSS	CCSDS, STDN	SGLS	TDRSS, NASA GN
	Comm Up/Downlink Band	S, X, UHF, Ka, Ku, etc.	X- and S-band	Cmd/Tlm: S-Band Data: Mission-specific	Cmd/Tlm: S-Band Data: Mission-specific	S-band	L-band/S-band	S-band/S-band
	Structure	description	Al honeycomb hexagon	Al Honeycomb Hexagon	6 panel rect. Box, CFRP facesheets w/Al Honeycomb core	Al ESPA Ring	Al Honeycomb Octagon	Al Honeycomb Octagon
	Propulsion	type, fuel	Mono-prop (N ₂ H ₄)	Mono-prop (N2H4)	Blowdown, Mono-prop (N2H4)	Mono-prop (N2H4)	Mono-prop (N2H4)	Mono-prop (N2H4)
	Propellant Capacity	kg	95	38	105 (LM400 baseline load of 49)	305 kg hydrazine 4 kg pressurant	39.4 nominal, 114 tank capacity	353.5
	Max delta V	m/s	200	90	350	800	191 nominal	149
Programmatic	heritage mission(s)	name(s)	QuickSAT, QuickBird, ICESat, CloudSat	MRO, IKONOS	GRAIL, XSS-11	LROSS	NFIRE, C/NOFS, RHESI, MightySat II	Fermi, GeoEye-1, Swift, Coriolis
	nominal schedule	months (ATP to ready for payload I&T)	23	27	18	20	26	28
	nominal schedule	months (ATP to launch)	35	38	31	28	39	45
Contract Options	Contract Option #1	description				Eagle-1 (single-string LEO optimized configuration) (see comments above)	Mission Operations Center	Mission Operations Center
	Contract Option #2	description				Eagle-2 (dual-string LEO optimized configuration) (see comments above)		
	Contract Option #3	description						
	Contract Option #4	description						
	Contract Option #5	description						

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	Contractor >> Spacecraft Name >>		Orbital	SST-US LLC	SST-US LLC	SST-US LLC	Thales Alenia France	Thales Alenia Italy
	Parameter	Units	LEOSTAR 2	SSTL-150	SSTL-300	SSTL-600	PROTEUS	PRIMA
Compatibility	Orbit Average Payload Power (EOL)	W (EOL)	850	50	140	386	300	1,100
	Maximum Payload Mass	kg	500	50	150	200	300	1,138
	Bus Dry mass (w/o Payload)	kg	938	103	217.7	429	300	1,032
	Science Data Downlink	kbps	300,000	80 Mbps (X-Band)	105 Mbps (X-Band)	105 Mbps (X-Band)	1,000	up to 310
	Science Data Storage (Capacity)	Mbit	500,000	16,000	16,000	128	2,000	up to 1,200 (EOL)
	Pointing Knowledge	arcsec	42	25	72	360	20	< 18
	Pointing Control	arcsec	48	36	360	605	72	< 36
	Pointing Stability (Jitter)	arcsec/sec	1	1.5	2	mission-specific	3	< 1
	Slew rate	deg / min	60	1 deg/sec	0.75 deg/sec	1 deg/sec	n/a	up to 1'/sec
	Mission Design Life	years	5 with expendables for 7	7	7	4	5	7
	Compatible LVs	(names)	Delta II	Falcon 1e, Atlas, Delta, Athena and other launchers	Falcon 1e, Atlas, Delta, Athena and other launchers	Falcon 1e, Atlas, Delta, Athena and other launchers	Ariane 5, Athena 2, Cosmos, LM-2D, PSLV, Rokot, Spoyuz, Taurus	Soyuz, Delta II, Zenit, Ariane 5, Eurockot, Dnepr, PSLV, Cosmos, Taurus, Falcon-9
	Nominal Orbit	Altitude, Inclination, Type, Other	600 km 97.8 deg Sun Synch	630km, 99 deg	700km, 98.7 deg	23,590km, 56 deg	1,396 km, 66 deg	620 km, 98°, Sun Synch
	Types of Orbits Available	as needed	400 km to 1,000 km at any inclination	LEO from 400km to 1,000km, any inclination	LEO from 400km to 2,000km, any inclination	LEO, MEO, GEO	Inclination from 20° to 140°, altitude from 600km to 1,500km	LEO from 0 deg to SSO inclination, up to 1,500 km
External Payload Volume	meters	1.54 m x 1.24 m x 1.66 m	730mm x 455mm x 774mm	730mm x 455mm x 1,000mm	1900mm x 1400mm x 476mm	Depending on launch fairing envelop	1.344 m x 1.344 m x 0.7 m h (on top floor) 1.344 m x 0.7 m x 3.3 m h (on two lateral panels)	
Internal Payload Volume	meters	Limited	279.5mm x 231.5mm x 252.5mm	279.5mm x 231.5mm x 252.5mm	901mm x 908mm x 260mm	Depending on payload module selection	1 bay, 1.23 m ³	
Description	ACS	type	3-axis stabilized	3-axis control with Reaction wheels and Magnetorquers	3-axis control with Reaction wheels and Magnetorquers	3-axis control with gyros and Reaction wheels	3 axis stabilized with 0 angular momentum	3-axis
	Star Trackers	# of STs	3 for 2 redundant	1	1	Not baselined	2	2 (able to manage up to 3)
	GPS	# receivers	1 internally redundant	1	2	Not baselined	1	2
	Batteries	cell type/capacity (Ah)	Li-Ion / 320 A-hr	Li-Ion/15Ah	Li-Ion/15Ah	Li-Ion/60Ah	Li-Ion (953P) / 78Ah	Li-Ion/up to 340 Ah
	Solar Arrays	cell type/Area (m2)	4-panels, triple junction cells, 14.4 m ² total area	Triple Junction GaAs, 1.15m ²	Triple Junction GaAs, 2.44m ²	Silicon, 6.8m ²	Standard Si / 3200 cells	Triple Junction GaAs/18.3 m2
	Main Bus Voltage Range	volts	24 - 34	28V-33V	28V-33V	26.5V-38V	23-37 V	23-38
	C&DH Bus Architecture	description	Distributed C&DH and ACS processors, 1553 bus and serial interfaces	CAN Bus	CAN Bus	CAN Bus	1553	Mil-Std-1553B
	Downlink Formats	CCSDS, STDN, etc	CCSDS	SSTL	SSTL	SSTL	CCSDS	CCSDS
	Comm Up/Downlink Band	S, X, UHF, Ka, Ku, etc.	S-Band Command and Telemetry, X-band Science Data Downlink	S-Band	S-Band	S-Band	S-band	S-Band or X Band
	Structure	description	Cuboid with twin articulated solar array wings	Aluminum/ Aluminium skinned honeycomb panels	Aluminum/ Aluminium skinned honeycomb panels	Aluminum/ Aluminium skinned honeycomb panels	Cubic shape made with Al bars and Al honeycomb panels	Al alloys Honeycomb, with CFRP facesheets (for internal items) and Al facesheets (for external panels), square base prism
	Propulsion	type, fuel	Monopropellant (N ₂ H ₄) blowdown system	Hot gas Xenon Resistojet	Hot gas Xenon Resistojet	Liquified Butane Gas	Momopropellant, Hydrazin (N2H4)	Mono-propellant, N2H4
	Propellant Capacity	kg	282	12	12	66	28	134
	Max delta V	m/s	371	36	35	91.4	120	150
Programmatic	heritage mission(s)	name(s)	Dawn	RapidEye, DMC-4, TopSat	RapidEye, DMC-4, TopSat, NigeriaSAT-2	GIOVE-A	JASON 1&2, CALIPSO, COROT and SMOS	COSMO FM1, COSMO FM2, COSMO FM3, RADARSAT-2
	nominal schedule	months (ATP to ready for payload I&T)	30.5	24	31	31	22	26
	nominal schedule	months (ATP to launch)	42	31	37	39	32	39
Contract Options	Contract Option #1	description		Enhanced X-Band Transmitter	Enhanced X-Band Transmitter	High-Speed Data Recorder		Prima-S (Small)
	Contract Option #2	description		X-Band Antenna Pointing Mechanism	X-Band Antenna Pointing Mechanism	Enhanced X-Band Transmitter		Prima with Advanced Data Handling
	Contract Option #3	description		Enhanced Small Satellite Reaction Wheel	SmallWheel 200SP Reaction Wheel	X-Band Antenna Pointing Mechanism		Prima High Agility Add-on
	Contract Option #4	description		Ground Station Provision	Ground Station Provision	SSTL 600 Fine Pointing		
	Contract Option #5	description				Ground Station Provision		