SSTL-150 ESPA Satellite Platform





65 kg payload mass 120 W / 85 W payload power (peak/OAP) 7-year lifetime



SSTL-100 15 kg / 24 W



SSTL-150 ESPA

65 kg / 120 W



SSTL-150 50 kg / 50 W



SSTL-300 150 kg / 140 W



SSTL-600 220 kg / 386 W

Surrey Satellite Technology is the world leader in the provision of small satellite solutions, applications, and services, with an unparalleled heritage and track record

- *47 spacecraft launched to date
- *100% mission success for 15 years
- *Over 250 on-orbit years of operational experience
- Versatile modular platforms
- *Customizable platforms to meet mission requirements
- wIn-house end-to-end capabilities
- »Design, manufacture, integration, test, launch, and operation



SSTL-150 ESPA Satellite Platform

Surrey has developed its portfolio of small satellite platforms to meet demanding customer requirements for Earth observation, science, technology demonstration, and communications applications.

The SSTL-150 ESPA is an efficient mechanical configuration of the SSTL-150 small satellite platform, which is able to take advantage of ESPA rideshare opportunities on a range of U.S. launchers and can accommodate a wide range of payloads for LEO missions.

The SSTL-150 ESPA platform's versatility enables it to be used for a single-bus mission or for a cost-effective constellation mission. Its volume-efficient packaging, dimensions, and generic ESPA launch interface offer the potential for multiple buses to be simultaneously launched.

Surrey's SSTL-150 ESPA platform avionics have accumulated over 30 years of in-orbit heritage and are at the heart of the CFESat and OTB ESPA-launch missions.

The SSTL-150 ESPA platform provides a cost-effective solution for flying a wide range of payloads with a variety of power and CONOPS requirements.

SSTL-150 ESPA Baseline Specification

Indicative Mission Compatibilit	У
Orbit Average Payload Power	120 W / 85 W (peak/OAP) EOL
Maximum Payload Mass	65 kg
Bus Dry Mass	115 kg
Payload Data Downlink	2 Mbps, S-band
Payload Data Storage	16 Gb capacity, dual-redundant mass memory
Pointing Knowledge	0.6 deg (roll, yaw), 0.8 deg (pitch)-
Pointing Control	2 deg all 3 axes
Pointing Stability (Jitter)	1.5 arcsec/sec
Slewrate	1 deg/sec
Position Knowledge	10 m
Mission Design Life	7 years
Compatible Launch Vehicles	ESPA rideshare on EELV vehicles and SpaceX vehicles
Types of Orbits Available	LEO 400 km to 1000 km, any inclination
Payload Volume (Green Volume)	410 x 547 x 244 mm (lower payload bay) 475 x 505 x 211 mm (upper payload bay) Additional accommodation available on Earth facing Facet up to 130 mm in Z direction with coordination
Bus Description	
Attitude Control System	3-axis control with reaction wheels and magnetorquers
Batteries	Li-ion cells providing 15 Ah capacity
Solar Arrays	Triple junction GaAs cells
Main Bus Voltage Range	28–33 V range
C&DH Bus Architecture	Dual-redundant controller area network (CAN) bus
Communication Up/Downlink Band	S-band uplink/S-band downlink
Structure	Aluminum and aluminum-skinned honeycomb panels
Thermal Control	Primarily passive, plus limited use of heaters
Heritage and Programmatic In	formation
Heritage Missions	OTB (2017), CFESat
Nominal Schedule from Order	24 months to payload Integration, 31 months to launch



SSTL-150 ESPA (OTB) in flight configuration



SSTL-150 ESPA (OTB) in launch configuration





SSTL-150 Baseline Schedule

- * 24 months to payload integration
- * 31 months to launch
- » We can deliver to more aggressive timescales to meet mission needs if required

SSTL-150 ESPA Implementation Schedule

Milestone defined by: X															I	Мo	nth	ηA	RC														
Project activity defined by:		YEAR 1								YEAR 2												YEAR 3											
Milestone or Project Activity	Payment Event	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31 :	32
SRR-Spacecraft Requirements Review	1	X																															
Observatory Mission Design	-																																
PDR—Preliminary Design Review	2			X	$\langle \rangle$																												
Observatory Design	-																																
CDR-Critical Design Review	3									Х																							
Subsystem Material Procurement	-																																
Subsystem Module Manufacture	-																																
Subsystem Module Test	-																																
Subsystem Shipment to Surrey US	-																		Х														
MRR-Module Readiness Review	4																		Х														
Platform Assembly/Integration	-																																
Platform Testing	-																																
IIRR-Instrument Integration Readiness Review	5																									K							
Observatory Integration	-																																
Observatory Testing	-																																
PER/TRR Test Readiness Review	6																											Х					
Observatory Environmental Testing	-																																
PSR—Pre-shipment Review	7																													X			
Shipment to Launch Site	-																																
OAR-Observatory Acceptance Review	8																														Х		
Launch Campaign	-																																
Launch	-																															Х	
On-Orbit Performance Verification	-																																
In-Orbit Acceptance	9																																Х



SSTL-150 ESPA (CFESat) in flight configuration



SSTL-150 ESPA (OTB) in Surrey US clean room



Surrey Facilities

Surrey Satellite Technology has length and breadth of experience in integrating several instruments into a single core spacecraft and has the capabilities of successfully delivering multiple concurrent missions. Surrey Satetllite Technology US LLC draws on the world-leading capabilities and heritage of the whole Surrey group, contracting with Surrey Satellite Technology Limited (SSTL) in the U.K. for the provision of the satellite platform, under strict information controls. The tested and accepted platform are shipped to the U.S. for payload integration.

Payload integration, observatory-level testing, launch support, and operations are conducted by Surrey U.S. personnel, using Surrey's U.S. facilities in Englewood, Colorado. Environmental tests are performed at local commercially available test facilities.

Mission-Specific Modifications

Surrey's modular, flexible and adaptable platforms are designed to accommodate a wide range of mission-specific requirements. Our collaborative style of working with customers supports the development of innovative solutions to enhance baseline bus performance, at an incremental cost, in areas such as:

- * Payload accommodation: increased mass, volume, or CoG
- * Attitude and orbit control systems: enhanced agility, control and knowledge
- * Power: increased power generation or challenging operational power usage
- * Mission: orbit, launch vehicle compatibility, delivery schedule
- » Customization: CCSDS compatibility, platform customization, etc.

Costed Contractual Options

- * X-band transmitter: data rates up to 500 Mbps
- * Enhanced small satellite reaction wheels: wheel momentum of 1.5 Nms
- * Star tracker: improved pointing knowledge better than 3 arcsec
- » Propulsion: propulsion capability up to 31.1 m/s ΔV
- * Antenna pointing mechanism: ±110 deg elevation, ±270 deg azimuth
- » Surrey satellite compatibility ground station update: S/X-band mini-rack and Mission Control Suite

Platform Customization

Surrey's approach and platform architecture lend themselves to adaptations and modifications to provide custom solutions, as performed for many of Surrey's customers, in order to fulfill specific payload or mission requirements.

Surrey Satellite Technology US LLC

345 Inverness Drive South, Suite 100 Englewood, CO 80112 Tel: 303.790.0653 | Fax: 303.792.2386 E-mail: info@sst-us.com www.sst-us.com Rapid Spacecraft Development Office (RSDO) NASA Goddard Space Flight Center Mail Code 401.1 Greenbelt, MD 20771 USA Phone: 301-286-1289 E-mail to: rsdo@rsdo.gsfc.nasa.gov