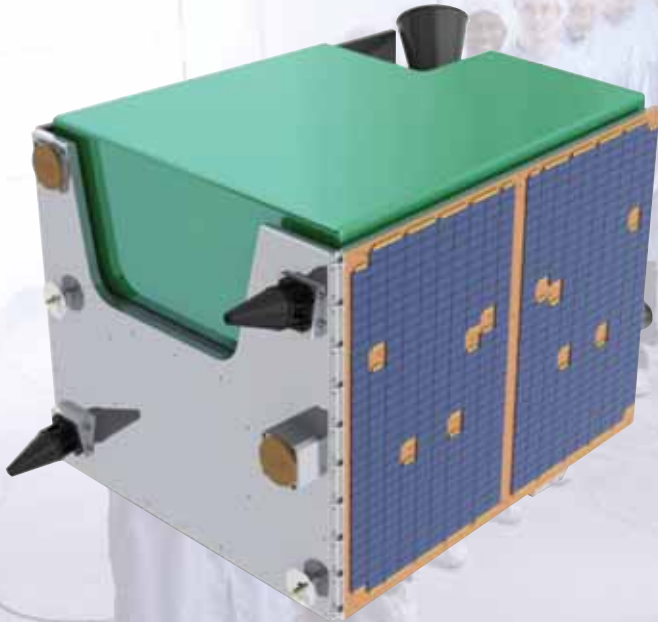
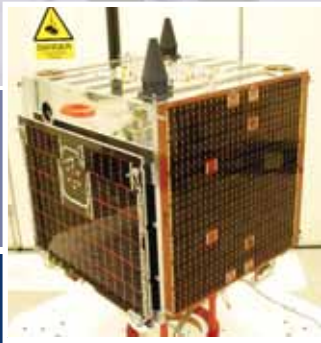


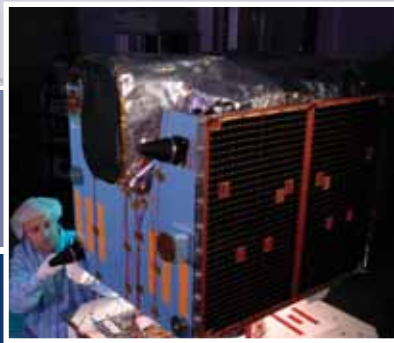
SSTL-150 Satellite Platform



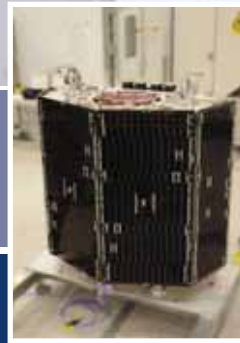
50kg Payload Mass
100W Payload Power (Peak)
5 to 7-Year Lifetime



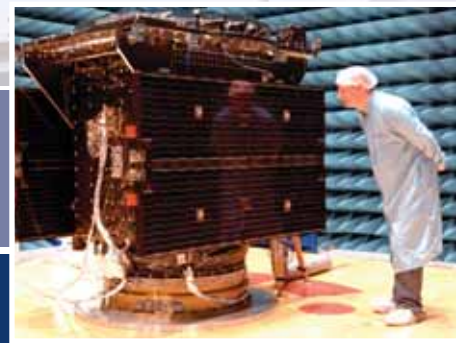
SSTL-100 :
15kg/24W



SSTL-150 :
50kg/50W



SSTL-300 :
150kg/140W



SSTL-600 :
200kg/386W

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

- 34 spacecraft launched to date
- 100% mission success for 10 years
- Over 200 on-orbit years of experience
- Versatile modular platforms
- Customizable platforms to meet mission requirements
- In-house end-to-end capabilities
- Design, manufacture, integration, test, launch, operation

The Surrey SSTL-150 Platform

Surrey has developed its portfolio of small satellite platforms to meet demanding customer applications.

The SSTL-150 is based on Surrey's heritage platform design used for the DMC + 4, TopSat and RapidEye 5-satellite constellation missions which have accumulated over 13 years of in-orbit heritage.

The SSTL-150 is an enhanced version of Surrey's SSTL-100 platform, with substantial improved payload capacity, improved propulsion and added high altitude agility.

The SSTL-150 provides versatile payload accommodation and its straightforward interface makes it ideally suited for use with customer supplied payloads. It is capable of carrying a wide range of payloads requiring 50kg/50W baseline capability.

The location of the payload panel provides an unobstructed view of much of the sky.

The SSTL-150 provides a compelling combination of mission lifetime, payload-carrying capability and performance, which is world leading for its size.

Baseline Performance Specification

The SSTL-150 platform provides a robust and flexible baseline solution with the potential to enhance mission capabilities to meet customer-specific requirements.

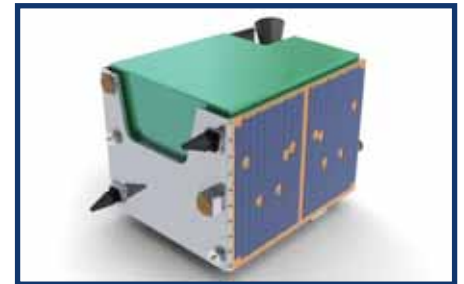
Mission Compatibility	
Orbit Average Payload Power	50W (100W peak) EOL
Maximum Payload Mass	50kg
Bus Dry Mass	103kg without payload
Science Data Downlink	80Mbps, X-Band
Science Data Storage	16 Gbytes capacity, dual-redundant mass memory
Pointing Knowledge	25 arcsec (1 sigma) all 3 axes
Pointing Control	36 arcsec (1 sigma) all 3 axes
Pointing Stability (Jitter)	1.5 arcsec/sec
Slewwrate	1 deg/sec
Position Knowledge	10m
Mission Design Life	7 years, Ps= 92%
Compatible Launch Vehicles	Falcon 1e, Atlas, Delta, Athena and other launchers
Types of Orbits Available	LEO 400km to 1000km, any inclination
External Payload Volume	730mm x 455mm x 774mm
Internal Payload Volume	279.5mm x 231.5mm x 252.5mm
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, total area 1.15m ²
Main Bus Voltage Range	28V-33V 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
Propulsion	Hot gas Xenon resistojet
Delta V	36m/s
Thermal Control	Primarily passive, plus limited use of heaters
Heritage & Programmatic Information	
Heritage missions	RapidEye, DMC + 4, TopSat
Nominal schedule from Order	24 months to payload integration, 31 months to launch



RapidEye 5-satellite constellation



TopSat



SSTL-150 in launch and flight configuration (no deployable panels)



SSTL-150 baseline configuration

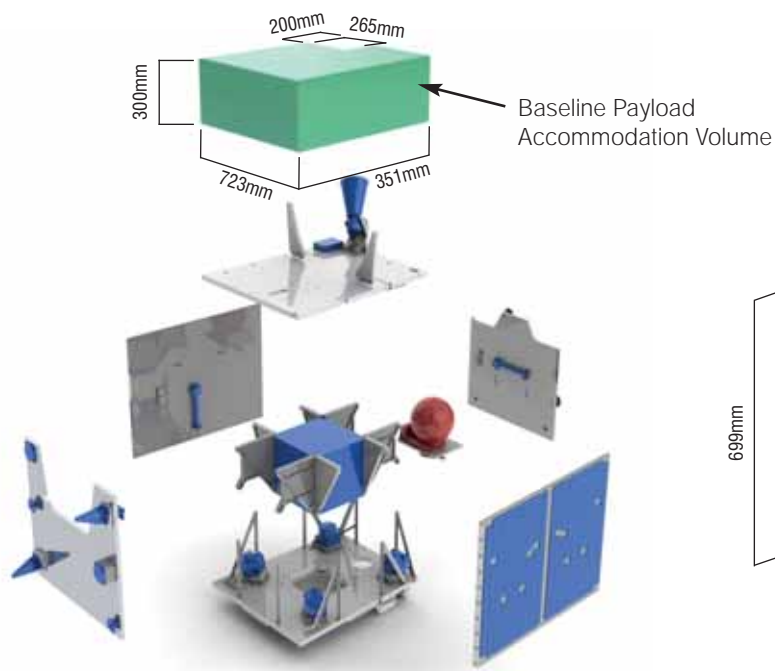


Surrey Mission Control

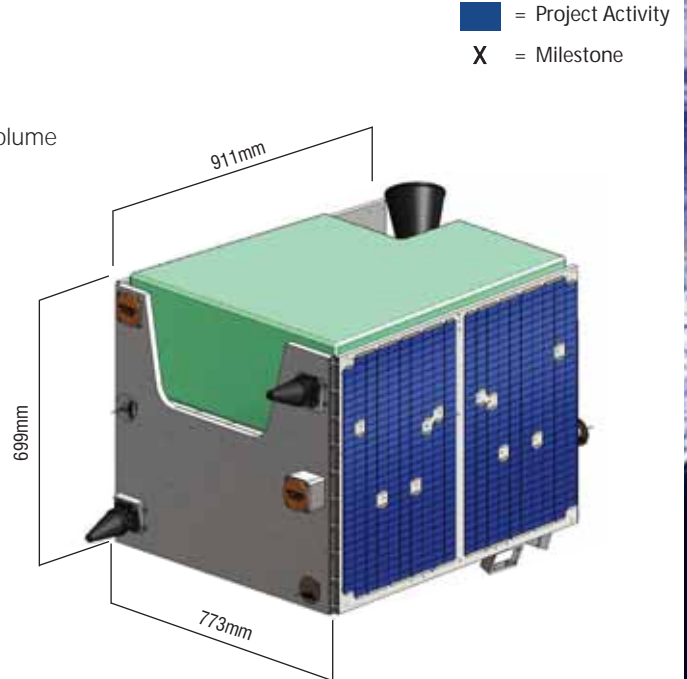
SSTL-150 Baseline Schedule

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

SSTL-150 Implementation Schedule	Payment Event	Month ARO																																
		YEAR 1												YEAR 2												YEAR 3								
Milestone or Project Activity		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																													
Observatory Design	-			■	■	■	■	■	■	■																								
CDR - Critical Design Review	3									X																								
Platform Material Procurement	-				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Platform Module Manufacture	-					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Platform Module Test	-																																	
MRR - Module Readiness Review	4																			X														
Platform Assembly Integration and Test	-																				■	■	■	■	■	■	■	■	■	■	■	■	■	■
TRR - Platform Test Readiness Review	-																																	
Platform Environmental Testing	-																																	
Platform Delivery Readiness Review	-																																	
Platform Shipment to SST-US	-																																	
IIRR - Instrument Integration Readiness Review	5																																	
Observatory Integration	-																																	
Observatory Testing	-																																	
PER - Pre-Environmental Review	6																																	
Observatory Environmental Testing	-																																	
PSR - Pre-Shipment Review	7																																	
Shipment to Launch Site	-																																	
Launch Campaign	-																																	
Launch	-																																	
On-Orbit Performance Verification	-																																	
OAR - Observatory Acceptance Review	8																																	



SSTL-150 Exploded CAD



SSTL-150 in launch and flight configuration

Surrey Facilities

Surrey has length and breadth of experience in integrating several instruments into a single core spacecraft and has the capabilities to successfully deliver multiple concurrent missions.

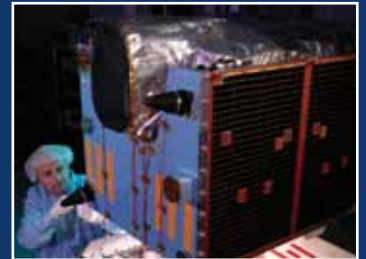
SST-US will draw on the world-leading capabilities and heritage of the whole Surrey group. SST-US will contract with SSTL for the provision of the satellite platform, under strict information controls. The tested and accepted platform will be shipped to the US for payload integration.

Payload Integration, Observatory-level testing, launch support and operations will be conducted by SST-US personnel, using SST-US facilities. Environmental tests will be performed at local commercially-available test facilities.

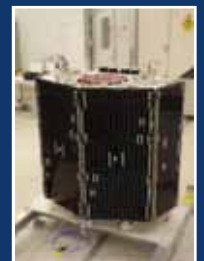
Mission-Specific Modifications

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



RapidEye: Standard
SSTL-150 configuration



NigeriaSAT2:
SSTL-300
Customized
Mechanical
configuration

Costed Contractual Options

- **Enhanced X-band Transmitter:** Data rates up to 300Mbps
- **Enhanced Small Satellite Reaction Wheel:** Wheel momentum of 1.5Nms
- **X-band Antenna Pointing Mechanism:** ± 110 deg elevation, ± 270 deg azimuth
- **Ground Station provision:** S/X-band mini-rack and Mission Control Suite

Platform Customization

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



GIOVE-A: Modified subsystem
configuration of SSTL-600 for
MEO mission



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