SSTL MicroSat-70: Modular Microsatellite

The SSTL MicroSat-70 platform employs a flexible modular design capable of supporting a wide range of missions in low Earth orbit. The microsatellite combines a comprehensive range of flight-proven technologies and demonstrated tailor-made services at a low cost. These platforms have been applied to Earth Observation, Communications and Technology Demonstration missions for civil and military use. SSTL has designed, built, launched and operated 17 microsatellites. The microsatellites are operated in orbit from SSTL's own mission control centre at its facility.

Applications

- Earth Observation - Meteorology, Environmental
- Store & Fwd Communications
- Science & Technology
- Civil and Defence

Spacecraft

- 50-70 kg typical
- Up to 23.8 kg payload mass
- LEO, all inclinations
- Compatible with Cosmos-3M, Ariane-4, Cyclone, Delta, Athena, Taurus, Zenit , COSMOS, etc.
- Design Life of 3 years or more. Proven to over 10 years operation

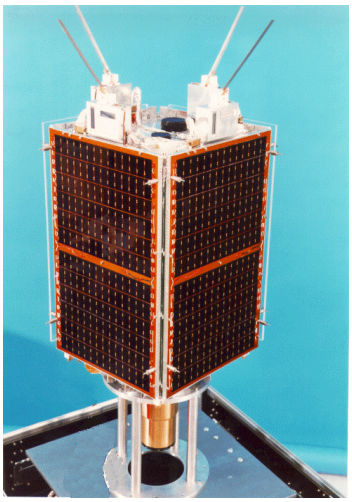
Qualification

- Flown on the following Missions: UoSAT-3, -4, -5, KITSAT-1, S80/T, HealthSat, POSat, FASAT-Alfa, CERISE, FASAT-Bravo, Thai-Paht, CLEMENTINE, TiungSat, Tsinghua-1
- Due for Launch: PICOSat

The SSTL MicroSat-70

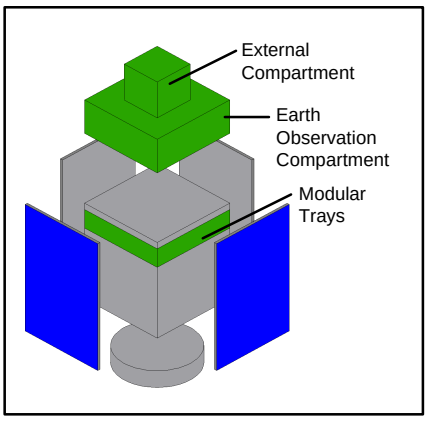
The SSTL MicroSat-70 has been designed and built to an innovative and highly modular design to meet the need for satellites that can be readily adapted to accommodate different payloads and mission objectives - rapidly and at low cost.

Despite their relatively small size and mass, the SSTL microsatellites are extremely capable. State-of-the-art, powerful on-board computers and sophisticated data handling systems enable complex housekeeping and payload operations to be carried out in orbit safely and with a high degree of autonomy. Coupled with extensive solid-state mass data storage, the on-board computers are able to provide an advanced processing capability for payload data not yet available on larger, more conventional satellites.



SSTL Modular Microsatellite

Reliability in orbit is achieved by the use of a highly integrated, layered system architecture - with operational redundancy provided, wherever possible, via redundancy or via alternative technologies. This is further enhanced by the ability to reload and re-programme the spacecraft software whilst in orbit thus enabling the satellite to benefit from software upgrades throughout its operational life.



Features

- **Modular Design** allows the use of previously qualified systems whilst maintaining flexibility
- **Rapid Development** - ready-to-launch 19 months from contract signing
- **Low Cost** - SSTL commercial approach and experience in small satellites
- **Payload Flexibility** - Modular trays, Earth Observation and External areas available
- **Launcher Compatibility** with a wide variety of launchers.

- **Heritage** - 17 microsatellites based on the bus have been launched. SSTL has launched 19 small satellites in total.
- **Ground Segment** - SSTL can offer fully compatible ground station and mission control centre as well as training

SSTL MicroSat-70: Modular Microsatellite

Platform and Payload Specifications

Mission Timeline	Contract to Launch Readiness	19 months
	Design Life	typically three years or more
	Maximum lifetime	Mission dependent - UoSAT buses have operated for over 10yrs
Physical	Dimensions (stowed)	690x360x360mm
	Deployed antennas	843x582x582mm
	Mass	44.7kg
Power	Solar Panels	Four body mounted GaAs cell panels @35W each
	Peak Power	50W
	Battery	10cell 7Ah NiCd battery
	Dual Redundancy	BCR, Power conditioning & distribution modules
ADCS	Sensors	Sun sensors, magnetometers in 3 axes (x2)
	Actuators	3 reaction wheels, magnetorquer in three axes (x2)
	Attitude	3-axis zero momentum bias, nadir pointing, yaw control
	Pointing knowledge (3σ)	±0.5° all axes
	Pointing Capability(3σ)	±0.5° in sunlight
Navigation	NORAD & GPS	GPS Rx: 15m (1σ) position accuracy ±1km: updated NORAD TLE weekly
Command & Data Handling	Processor	Dual redundant: 80386EX, 25MHz with coprocessor
	Memory	128MB RAM per processor
	Operating System	In-orbit reprogrammable
Communications	Uplink	Dual redundant 16/128kbps BPSK, S-band Space Ops. Band
	Downlink	Dual redundant 2Mbps, QPSK, Viterbi, S-band Space Ops. Band
	Antennas	Omni patch antennas (2 per uplink) Quadrifilar Helix antenna (1 per downlink)
Operations Scheduling	On board Whole Orbit Data surveys	1s sampling programmable
	On board clock	Maintained by OBC, on-board GPS receiver or updated daily via groundstation, ±0.1s
Payload Accommodation	Mass	23.8kg (typical)
	Tray Module	Up to three tray modules: total volume of 350 x 350 x 78mm
	Earth Observation Compartment	280 x 280 x 110mm
	External	300 x 300 x 200 mm
Payload Data Interface	Central	Hardwired digital and analogue command and status lines
	Network	Dual redundant CAN 1Mbps packet (ISO-11898, 11519-1); RS422 & RS485 options
Payload Power Supply	Power Supply	Numerous switched and hardwired from unregulated 14V bus and regulated 5V bus

Associated Products and Services

- **Payload Expertise -** SSTL has extensive experience in payload procurement, design, assembly, integration and testing. SSTL has also already flown a number of its own, commercially available, imagers and communications payloads amongst others.
- **Ground Support -** Assembly, integration and test of the microsatellite is fully supported by SSTL-manufactured Electrical Ground Support Equipment (EGSE). The EGSE is also used for final checkout of the microsatellite at the launch site prior to launch.
- **Launch Support -** SSTL is expert at sourcing low cost launch opportunities and providing launch support for secondary payloads and has acquired launch experience with Delta, Ariane 4, Dnepr, Tsyklon and Zenit.
- **In-Orbit Commisioning & Operations -** Operations, or back-up operations, may be carried out from SSTL site in the Surrey Space Centre where SSTL have commissioned 17 spacecraft and operate and monitor spacecraft. SSTL has experience in Ground Segment provision and training.

For more information contact:
Rapid Spacecraft Development Office
NASA Goddard Space Flight Center
Mail Code 456
Greenbelt, MD 20771 USA

Phone: 301/286-1289
Web: http://rsdo.gsfc.nasa.gov