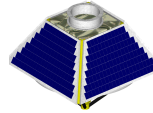


SSTL 'Constella'

Small satellite platform



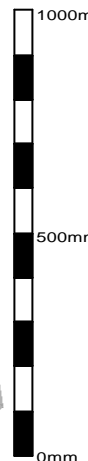
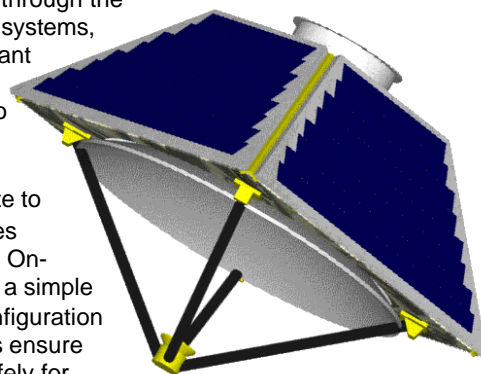
The SSTL 'Constella' platform is based on the well proven SSTL modular microsatellite. It is particularly suited to applications requiring a large instrument or payload bay on a small satellite. It is optimised for production and launch in batches on small low cost launchers, thus making the platform ideal for small communications or Earth Observation networks. It particularly copes well with the seasonal demands of polar, inclined and equatorial orbits, and is designed for a long lifetime demanded in commercial applications. The satellites can be operated in orbit from SSTL's own mission control ground station, or from customer stations.

The 'Constella' small satellite

The platform has been designed and built to an innovative and highly modular design to meet the demands for cost effective, small constellations of satellites that can be readily adapted to accommodate different payloads and mission objectives - rapidly and at low cost.

The spacecraft platform is based on the well proven SSTL microsatellite series. The modular sub-systems benefit from the extensive heritage of previous missions whilst the larger structure allows increased power, mass and volume for more demanding payloads and instruments. State-of-the-art, powerful on-board computers and sophisticated attitude and data handling systems enable complex housekeeping and payload operations to be carried out in orbit safely and with a high degree of autonomy. High fidelity 3-axis stabilisation and fine pointing control of the spacecraft is offered through a range of configurations. A cost effective, simple and safe N₂ cold gas propulsion system is sized for constellation deployment and 10 years of station keeping, leaving margin for end-of-life decommissioning.

Reliability in orbit is achieved through the use of largely dual redundant systems, and a single point failure tolerant system architecture. This is complemented 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. On-board autonomy coupled with a simple body mounted solar array configuration and robust operational modes ensure the spacecraft can survive safely for extended periods without ground intervention, reducing operations costs.



Features

- **Modular Design** - Employs previously qualified systems whilst maintaining flexibility. Can carry some SSTL minisatellite payloads in smaller launch volume.
- **Rapid Development** - 24 month programme for batch of 16 spacecraft.
- **Low Cost** - Cost engineered for batch production runs.
- **Payload Flexibility** - Modular trays, 1m² external area and large volume, available
- **Launcher Compatibility** - Special adaptor allows spacecraft to be accommodated in groups on a wide range of launchers.
- **Heritage** - Baseline for the GANDER constellation.
- **Ground Segment** - SSTL can offer fully compatible ground stations, remotely operated stations and mission control centres, as well as training

affordable access to space

Applications

- Earth Observation - Multi-spectral, Meteorology, Environmental monitoring
- Remote terminal data collection, Remote control operation.
- High speed Ku and Ka band communications
- Geolocation and Navigation

Spacecraft

- 70 - 140 kg total
- 10 - 60 kg payload mass
- 400 - 1400 km orbit altitude
- Compatible for batch launch on Cosmos (4-6), DNEPR (8-12), EUROCKOT (8), Athena (8), Taurus(8) and others.
- Mounts upright or sideways on launcher
- Design Life of 7 years (85%)

Qualification / Heritage

- Baseline for GANDER radar altimetry constellation
- Avionics and management techniques based on more than 10 missions

Contact



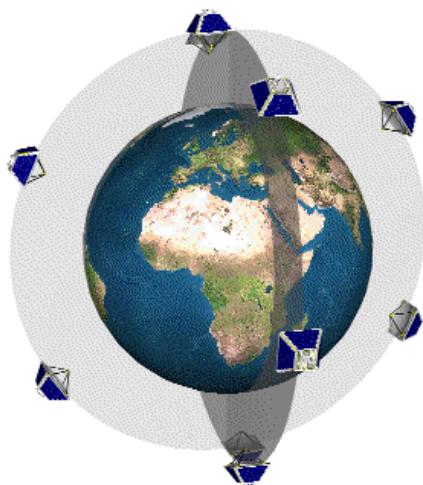
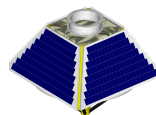
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Issue Number & Notice

SSTL-1002-02. 15-06-2000. This data sheet is not contractual and can be changed without any notice. Please contact SSTL (see above) for further information.

SSTL 'Constella' Small satellite platform



Associated Products and Services

- **Payload Expertise** - SSTL has extensive experience in payload procurement, design and AIT. SSTL has also already flown a number of its own, commercially available, imagers and communications payloads amongst others. Customer own payloads can readily be accommodated.
- **Ground Support** - Assembly, integration and verification of the microsatellite is fully supported by SSTL-manufactured Ground Support Equipment (GSE). The GSE 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, Zenit and Cosmos.
- **In-Orbit Commissioning & Operations** - Operations, or Platform maintenance operations, may be carried out from SSTL site in the Surrey Space Centre where SSTL have commissioned 13 spacecraft and operate and monitor spacecraft. SSTL has experience in Ground Segment provision and training.
- **Mission and Constellation Design** - Using state of the art tools and facilities, SSTL will work with you to make your mission a success.

Platform and Payload Specifications

| Sample mission configuration for Earth pointing mission with moderate pointing requirements. Contact SSTL for additional options. | | |
|---|--|---|
| Mission Timeline | Contract to Launch Readiness | 15 months (single spacecraft) 24 months (batch production of 16 spacecraft) |
| | Design Life | 7 years, 85% |
| | Maximum lifetime | 10 year fuel life time |
| Physical | Dimensions (stowed) | 1x1x0.6m; truncated pyramidal shape |
| | Antennas | 8 spacecraft on 2 layer dispenser 2.5x2.5m Ø |
| | Total spacecraft mass | Designed to carry 1m Ø Cassegrain dish antenna (payload) Typically 70 to 140kg Typically 1000kg for 8 spacecraft on dispenser |
| Power | Solar Panels | 4 Body mounted (Si 70W or GaAs 100W) |
| | Peak Power | 100W (Si) , 140W (GaAs) |
| | Battery | NiCd battery 200Wh @ 14V/28V |
| ADCS | Redundancy | BCR (x4), Power conditioning & distribution modules (x2) |
| | Sensors | Earth Horizon Sensors (x3), 3-axis magnetometers (x2), Optional Star Camera, gyros or sun sensors |
| | Actuators | Momentum wheels (x2), torque coils (x6) Optional Reaction wheels |
| Guidance & Navigation | Attitude | 3-axis stabilised – momentum bias – nadir pointing 3-axis /Zero Momentum option |
| | Pointing knowledge (3σ) | ±0.17° |
| | Pointing Capability | Control ±0.2°; slew 5°/s, stability 20arcsec/s |
| Command & Data Handling | Navigation | Optional GPS Rx: 100m (3σ) position accuracy |
| | Propulsion | N ₂ cold gas propulsion, 0.1N, 15m/s Resistojet or Monoprop options |
| | Processor | Dual redundant: 80386EX, 25MHz with numeric coprocessor |
| Communications | Memory | 8Mbyte, expandable to 128MB RAM per processor |
| | Operating System | SSTL SCOS. In-orbit reprogrammable |
| | Uplink | Hot redundant: S-band Rx. 16/64kbps, BPSK, no coding |
| Operations Scheduling | Downlink | Cold redundant: S-band 0.1-4W, 16k-2Mbps, QPSK, Viterbi |
| | Antennas | One per downlink antennas on +Z face; On +Z & -Z faces for each uplink. |
| | On-board Orbit Data surveys | 1s sampling programmable |
| Payload Accommodation | On-board clock | Updated daily via groundstation, ±0.1s or via GPS @ ±1ms |
| | Tray Module | Standard trays or ad-hoc: total volume of 1x0.3x0.3m |
| | Earth Observation Compartment with external access | 1x1x0.3m |
| Payload Data Interface | Local Area Network | Dual redundant CAN 1Mbps packet (ISO-11898, 11519-1); MIL1553, RS422 & RS485 options |
| Payload Power supply | Power Supply | Numerous switched and hardwired from unregulated 14/28V bus or regulated 5V bus. Power drain up to 1kW |

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