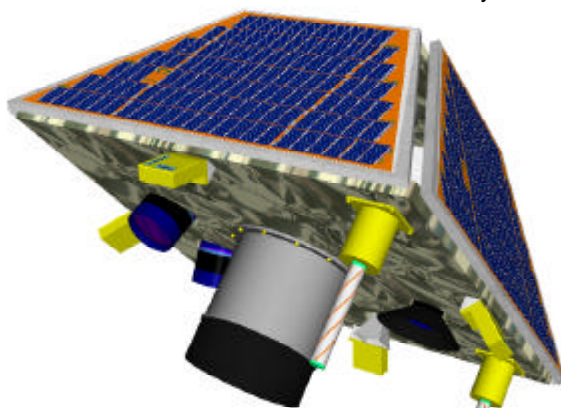


Earth Observation System



The SSTL EOS offers both wide angle multispectral and high resolution panchromatic imaging from a single small satellite. The platform is highly flexible and can be accommodated in a range of orbits as either a single spacecraft or as part of a constellation. The spacecraft includes features such as slewing, orbit control, extensive on-board memory and near real time image transmission via X-band. SSTL can also offer ground segment and launch services to form a complete turn-key system.

Space based Earth observation, due to its vantage point, is unique in its capability to provide timely coverage of large areas, indiscriminately across the globe. EOS is equipped with an advanced Earth observation payload which can offer high quality 3-band multispectral imaging and high resolution panchromatic imaging from a single 100 kg class spacecraft. Because the service is almost always available, mapping and surveying of vast areas can be carried out at a low cost once the system is operational. Depending on the orbit selected, revisit rates can occur every few days, thus providing an opportunity for timely monitoring of remote areas. To achieve increased coverage and greater revisit frequency it is possible to launch multiple spacecraft, economically on a single launcher, and operate them as a constellation.

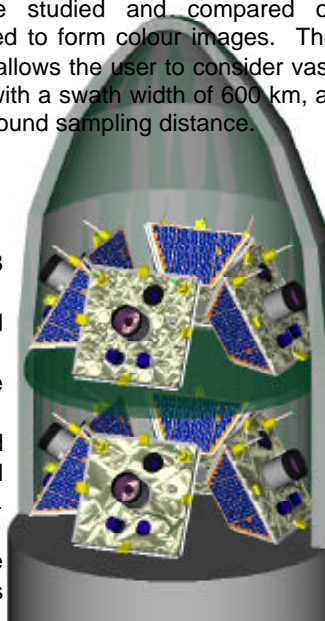


Panchromatic Imaging

The panchromatic imager is based on a linear array sensor with a ground sampling distance of 4 m, across a 25 km swath width. Swath length is only limited by on-board memory which can typically store 200 square scenes (25x25 km). The spacecraft agile off-pointing mode gives opportunity to point the imager $\pm 30^\circ$ off nadir, resulting in a greater coverage and revisit potential.

Multispectral Imaging

The multispectral imager is also based on a tri-linear array sensor. Each of the three arrays corresponds to a visible band: red, green and blue. The bands may be studied and compared or combined to form colour images. The imager allows the user to consider vast areas, with a swath width of 600 km, at 36 m ground sampling distance.



Features

- **Rapid Development** - ready-to-launch typically 18 months from contract signing
- **Low Cost** - SSTL commercial approach and experience in small satellites
- **Launcher Compatibility** allows the bus to be launched on a wide variety of launchers
- **Heritage** - UoSAT-12 was launched early 1999 and has been operating successfully since. It is based on experience of 14 previously launched SSTL microsatellites.
- **Turn Key System** - SSTL can offer fully compatible ground station, mission control centre, operations training and launch services ([see overleaf](#))

Applications

- Environmental monitoring
- Geological mapping
- Land use monitoring
- Vegetation monitoring
- Urban planning
- Port monitoring

Spacecraft

- Most orbits at 650 km
- Single or multiple deployment from various launchers
- 4 m / 25 km swath PAN P/L
- 36 m / 600 km swath MS P/L
- Near real-time imaging
- 100 kg wet mass
- S / X-band communications
- Orbit determination & control
- 3-axis attitude control $\pm 30^\circ$ off-pointing capability

Contact



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Issue Number & Notice

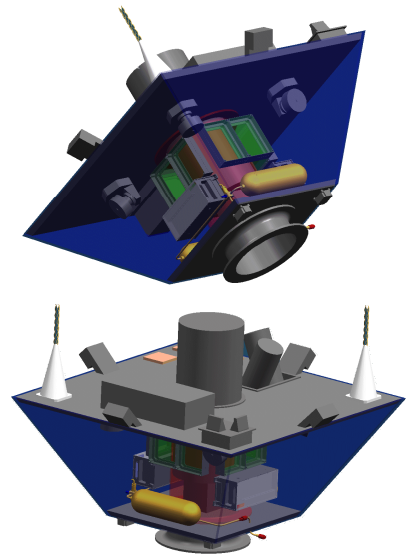
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Earth Observation System



Turn-key System

- **System Definition** - SSTL can perform studies to find the optimum mission configuration, benefiting from over twenty years of operational experience, experienced engineers and specialised analysis tools and methods.
- **Ground Segment** - A ground station for TTC communications and EO data transmission can be supplied by SSTL. SSTL also has experience in Ground Segment provision and training of staff.
- **Launch Support** - SSTL has gained considerable expertise at sourcing low cost launch opportunities and providing launch support for secondary payloads and has acquired launch experience with Ariane 4, Delta, Cosmos, Dnepr, Tsyklon and Zenit.
- **In-Orbit Commissioning & Operations** - Operations, or back-up operations, may be carried out from SSTL site in the Surrey Space Centre where SSTL already operate 13 other spacecraft.



Platform and Payload Specifications

Mission Timeline	Contract to Launch Readiness Design Life Maximum lifetime	Typically 18 months Typically 5 years Mission dependent - UoSAT buses have operated for over 10yrs
Panchromatic Payload	Optics Sensor Ground sampling distance Swath width	Reflective Linear array. 4 m @ 650 km 25 km
Multispectral Payload	Optics Sensor Ground sampling distance Swath width	Reflective Tri-linear array. NIR, red and green bands. 36 m @ 650 km 600 km
Physical	Dimensions (stowed) Deployed antennas Mass	1010 x 1010 x 850 mm excluding external equipment Dependent on configuration ~100 kg
Power	Solar Panels Power Generation Battery	4 body mounted Silicon cell solar panels Orbit dependant. Typically ~55 W at end of life Dual pack Nickel Cadmium battery
ADCS	Redundancy Sensors Actuators Attitude Pointing knowledge Pointing capability	Failure tolerant. Internal redundancy. 2-axis Sun sensors (x2), Earth sensors (x4), magnetometers (x2), Fibre optic gyro (x3) Reaction Wheels (x4), Dual wound magnetorquers (x3) 3-axis stabilised. $\pm 30^\circ$ off-pointing capability 0.1° (3 σ) <0.2° (3 σ)
Navigation	Navigation Propulsion	GPS receiver: 15 m (3 σ) position accuracy without SA Liquefied gas propulsion system. 8ms ⁻¹ .
Command & Data Handling	Processor Processor Memory Operating System EO Data Memory	Dual redundant: 80386EX, 25MHz with co-processor Expandable: 8 to 128MB RAM per processor. In-house OS. In-orbit reprogrammable 1.5 GB solid state data recorder; 8.0 GB hard drive data recorder.
Communications	TTC Uplink TTC Downlink EO data Downlink Antennas	Hot redundant S-band receiver Cold redundant S-band transmitter. Up to 8Mbps Hot redundant S or X-band transmitter. 10 to 105 Mbps Dual redundant scheme. Near global coverage for TTC Rx.
Operations Scheduling	On board orbit data surveys On board clock	1s sampling programmable Updated via GPS

affordable access to space