

# Surrey Missions: DMC

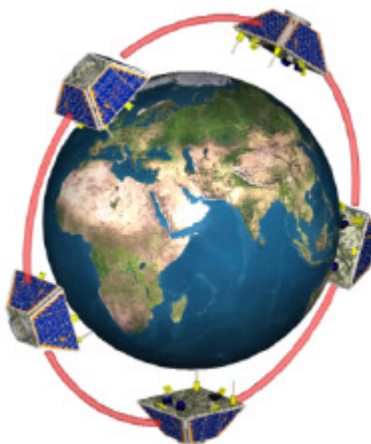
## Disaster Monitoring Constellation



The Disaster Monitoring Constellation is a novel international partnership led by Surrey, comprising a network of five small satellites and ground stations. DMC has individual space segment owners, to jointly provide daily revisit to any point on the globe through the consortium of owners. From a low Earth orbit, each satellite offers 36 metre, multispectral imaging, over a 600 km swath width. The constellation offers dynamic remote sensing services at high temporal resolution. The consortium has agreed to donate 5% of images to relief agencies via the Reuters Foundation Alertnet.

### The Disaster Monitoring Constellation

The basic DMC structure employs SSTL's "Constella" enhanced microsatellite platform which has been designed and built to an innovative and highly modular design to rapidly meet the demands of low cost small constellations of satellites. The modular sub-systems benefit from the extensive heritage of 18 previous SSTL small satellite missions and, the platform is compatible for batch launch on Cosmos, DNEPR, EUROCKOT, Athena, Taurus and others. The five DMC spacecraft are equi-spaced around a 686 km 98° Sun-synchronous orbit, offering daily images at the equator world-wide and several imaging opportunities per day at higher latitudes.



### The DMC Spacecraft

Each three-axis momentum bias stabilised DMC spacecraft carries a pushbroom multispectral imager, offering 36 m ground sampling over a 600 km swath from the constellation altitude. The imager has a dedicated solid state data recorder for image storage between ground station passes. Constellation phasing and maintenance over the 5 year mission lifetime is achieved using a safe, cost-effective gas propulsion system and the orbit is determined via an on-board SSTL GPS receiver. Four body mounted, silicon solar panels provide 55 W EOL orbit average power. On-board computers and sophisticated attitude and data handling systems enable complex housekeeping and payload operations to be carried out in orbit safely, with a high level of autonomy. This is complemented by, reliability largely through dual redundancy, and the ability to reload and re-programme software whilst in orbit, enabling the constellation to benefit from upgrades throughout its life. Payload data will be transferred to five 3.6 m ground stations via an 8 Mbit/s S-band downlink. Raw data from the DMC will be pre-processed, to allow fast delivery of visually intelligible imagery to the disaster relief community and service providers via The Reuters Foundation Alertnet.

### Applications

- *high temporal resolution imaging* - critical for provision of up-to-date information for environmental monitoring, crisis monitoring and other rapidly changing phenomena.
- *medium resolution optical data* - providing regional and local information on infrastructure, access & aid resources (agricultural monitoring & hydrological mapping), and monitoring the extent of damage zones (hazard mapping)

### Applications

- Dynamic remote sensing services
- Disaster management support:
  - floods, fires
  - earthquakes, volcanoes
  - landslides
  - large scale industrial accidents
  - civil strife

### Mission & Spacecraft

- Daily revisit , worldwide
- 5 equi-spaced s/c @ 686 km
- 80 kg mass; mass limit 140 kg
- 36 m / 600 km swath, tri-linear array imaging payload
- 3-axis momentum bias stabilised <0.01°/s, accuracy <1.0°
- On-board orbit control & GPS orbit determination
- Design Life 5 years

### Constella Platform

- Baselined for:
  - GANDER altimeter constellation
  - TOPSAT tactical optical satellite

### Contact



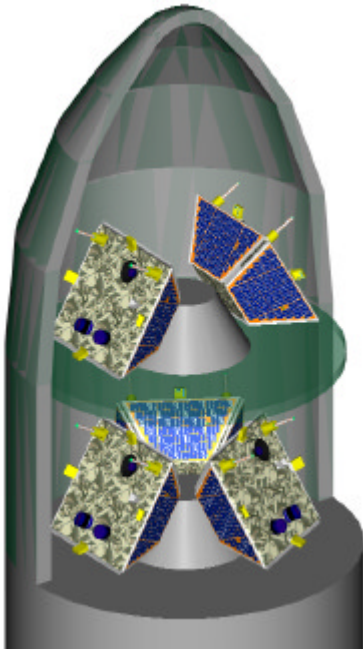
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### Issue Number & Notice

SSTL-5018-03. 15-10-2000. This mission data sheet is not contractual and can be changed without any notice. Please contact SSTL (see above) for further information.

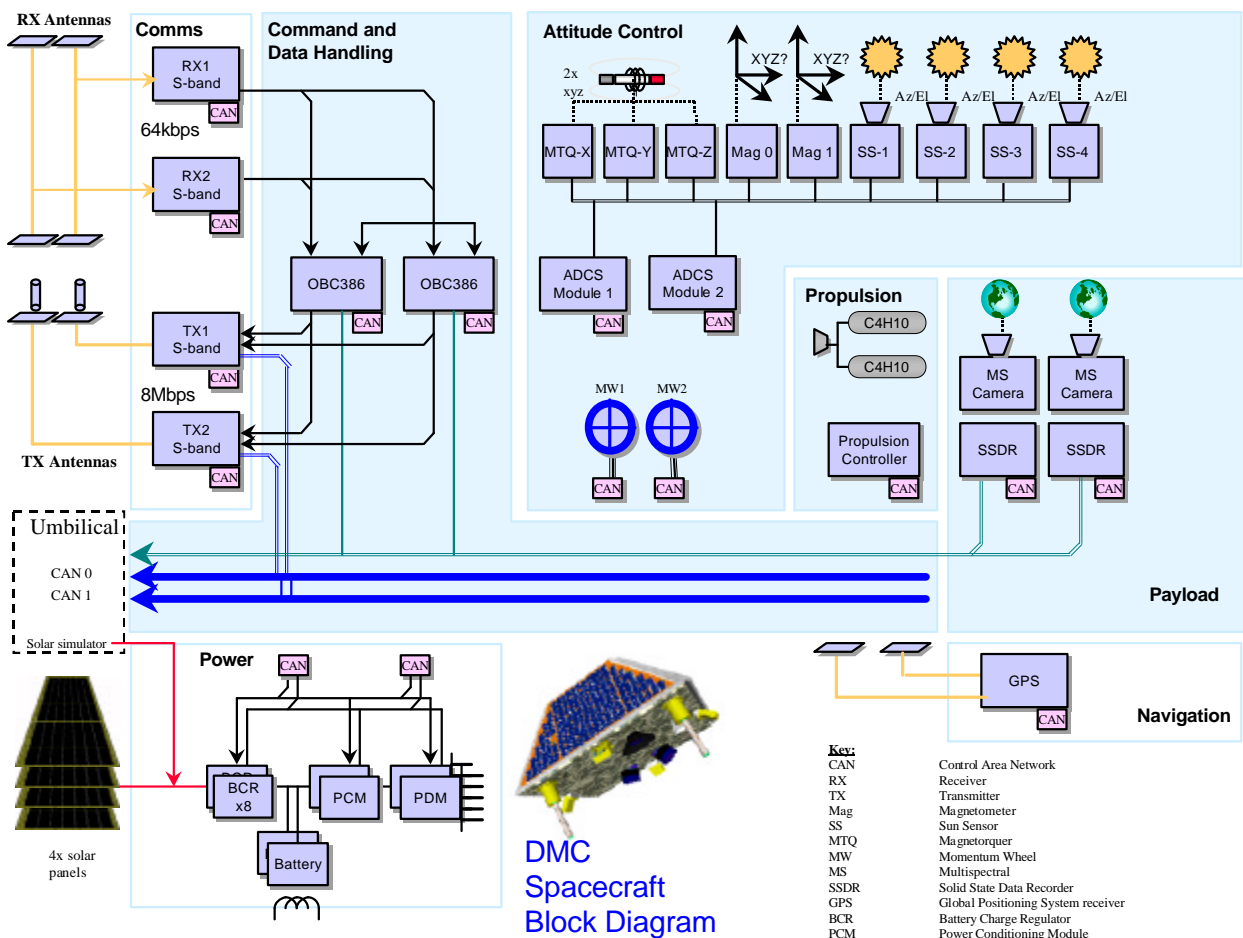
# Disaster Monitoring Constellation



## DMC Features

- **Revisit** - every 24 hours at the equator; revisit frequency increases with latitude offering several imaging opportunities per day for mid-latitudes
- **Resolution & Coverage** - 36 m nadir GSD; 600 km wide swath from LEO
- **Applications** - dynamic global Earth observation & disaster management support, primarily through fast delivery of visibly intelligible imagery
- **Opportunity for Growth** - inclusion of a 4 m GSD panchromatic Imager on each DMC spacecraft or, accommodation of other payloads that fit the platform envelope, is possible. [See datasheet 1003-01](#), or [contact SSTL for a quotation](#).
- **Lifetime** - nominal 5 year mission; propellant margin for an additional 2 years
- **End-of-Life** - At the end of the propellant-limited life each spacecraft will be subject to orbital decay and make way for its successor. Nevertheless each spacecraft will remain fully operational, but without maintaining its position with respect to the other spacecraft.
- **Launcher Compatibility** - a special adapter allows spacecraft to be accommodated in groups on a wide range of launchers.
- **Ground Segment** - SSTL is providing 3.6 m ground stations and a centralised mission planning system, fully compatible with the space segment and providing a direct 2-way interface to the disaster monitoring community service providers
- **Ownership & Operation** - each of the five partners will own and operate their own small satellite and ground facilities and will share by agreement; the network assets are shared co-operatively during UN declared disasters
- **Low Cost** - Total contract cost < £40 Million (FY2000)

## Disaster Monitoring Constellation Spacecraft: System Block Diagram



affordable access to space