Road Runner

Common bus architecture/common interfaces
High Performance small satellite bus
Flexible design easily adapted to various missions
Ready for flight within 24 months

MicroSat's Road Runner bus is a modular, reliable bus structure capable of accommodating a large payload mass. The bus design utilizes components with proven flight heritage that enable parallel processing of components on separate panels which allows for a great deal of the bus and payload production and testing to be performed in parallel.

Applications: Military, Scientific, Commercial

Features:

- High Payload Mass Fraction - can accommodate multiple payloads *(demonstrated on the TacSat-2 satellite with 11 on board experiments)*
- Compatible with multiple launch vehicles
- Designed using proven flight heritage materials, processes and components
- On-board theatre command and control data dissemination
- Navigation: On-board GPS receiver or vector upload via transponder
- Attitude Determination: Sun Sensor/Magnetometer and/or via Star Tracker
- Dynamic on-board cueing and re-tasking
- Enhanced reliability through Safe Mode feature
- Continuous fault monitoring capability
- Adaptable to new mission requirements
- Software update via ground command

Power:

- Can power SC components and payloads at 28 +6/-4 Volts
- Customized solar arrays using triple junction cell technology

Launch Vehicle Interface:

Road Runner's launch vehicle adapter has a standard interface size that accommodates multiple launch vehicles and separation systems including Falcon 1/Minotaur 1, larger launch vehicles and secondary flight opportunities. The spacecraft is flight ready in 12-24 months and delivers launch vehicle processing from stored state to on-orbit in 7 days and on-orbit checkout within 1 day.

Flight Qualification

The TacSat-2 program was the first Air Force Research Laboratory's (AFRL) flight demonstration program under the Operationally Responsive Space initiative featuring 11 onboard experiments being conducted during the spacecraft's planned 6- to 12-month mission. The successful December 16, 2006 launch of TacSat-2 demonstrated MSI's ability to provide a high performance small satellite for a very competitive price on a major responsive space program. MSI designed, built, and environmentally qualified the satellite bus, and was responsible for both the primary Gallium Arsenide (GaAs) solar arrays and the experimental thin-film solar arrays.

MSI demonstrated the ability to reuse the TechSat 21 bus design, which allowed MSI to deliver the basic bus structure to AFRL in 12 months from contract ATP, and also enabled MSI to provide the bus at very low cost. MSI completed nine months of on-site integration and test at AFRL in Albuquerque and supported payload integration, system testing, launch vehicle integration and testing and the launch readiness review. MSI also provided launch support, on-orbit testing and anomaly resolution.

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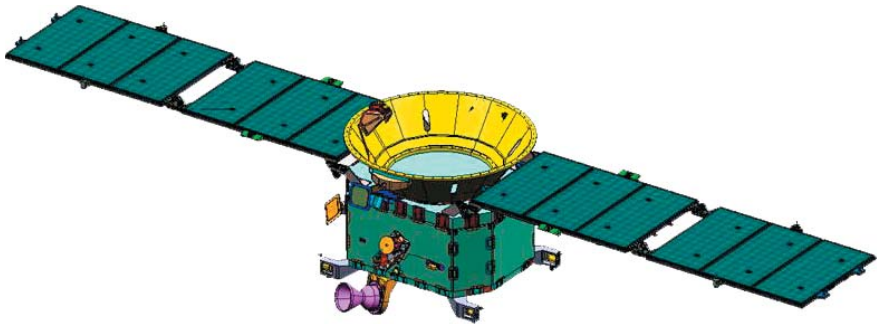
Reliable Affordable Spacecraft

TacSat-2 Launched December 16, 2006 Wallops Island, VA

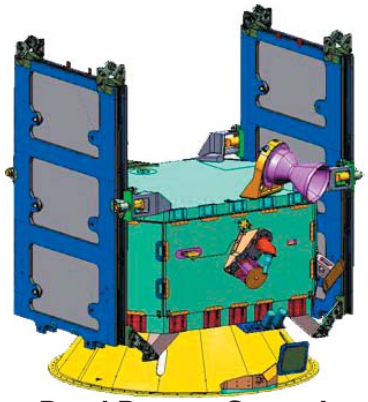
MICROSAT SYSTEMS

Road Runner Performance Parameters:

Parameter	Capability	
Delivery	12-24 months	
Mission Design Life	1-5 Years	1 Year design life with goal of 5 years
Launch Vehicle Compatibility	Falcon 1/ Minotaur 1	
Orbit Capability	TacSat-2 flew at 415 km and 40° inclination	LEO (Option for articulating arrays)
Spacecraft Control	3- Axis	Nadir, velocity, or inertial Std.
Max P/L Mass	216 Kg	Multiple experiments OK
External Payload Volume	.5 m^3	0.7m dia x 1.3 m h
Internal Payload Volume	.072 m^3	760mm x 410mm x 250mm
Bus Dry Mass	153 Kg	CBE for TacSat-2 configuration
Launch Mass	373 Kg	
Stowed Dimensions	2.0m x 1.1m x 1.0m	Spacecraft (bus + payloads)
Payload Power (Orbital. Average., Peak)	300 Watts, 748 Watts	Additional peak power available
Array Power (Avg., Peak)	452 Watts, 700 Watts	Fixed Array, Triple Junction GaAs
Battery Capacity	30 Amp-Hrs	Lithium-Ion
Pointing (Ctrl, Knowledge)	0.10 Deg, 0.05 Deg	Star Tracker, GPS, IMU
Slew Rate	0.34 – 0.64 Deg./ Sec.	Depending on Payload Configuration
Attitude Architecture Type		Three axis stablilized
Communications. (Uplink, Downlink)	32 kbps, 5 Mbps	L-Band, S-Band
Command & data Handling C&DH (MIPS, RAM, NVRAM)	165 MIPS , 640 Mbytes, 16 Mbytes	Rad 750 Power PC based, hard to 20 krads
Propulsion Delta-V	154 m/s	Hall Effect Thruster
Instrument Accomodation	Imagers, Communications, Atmospheric, Software, Component Demo	



Road Runner Deployed



Road Runner Stowed

MICROSAT SYSTEMS

For more information contact:
Rapid Spacecraft Development Office
NASA Goddard Space Flight Center
Mail Code 402
Greenbelt, MD 20771 USA

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