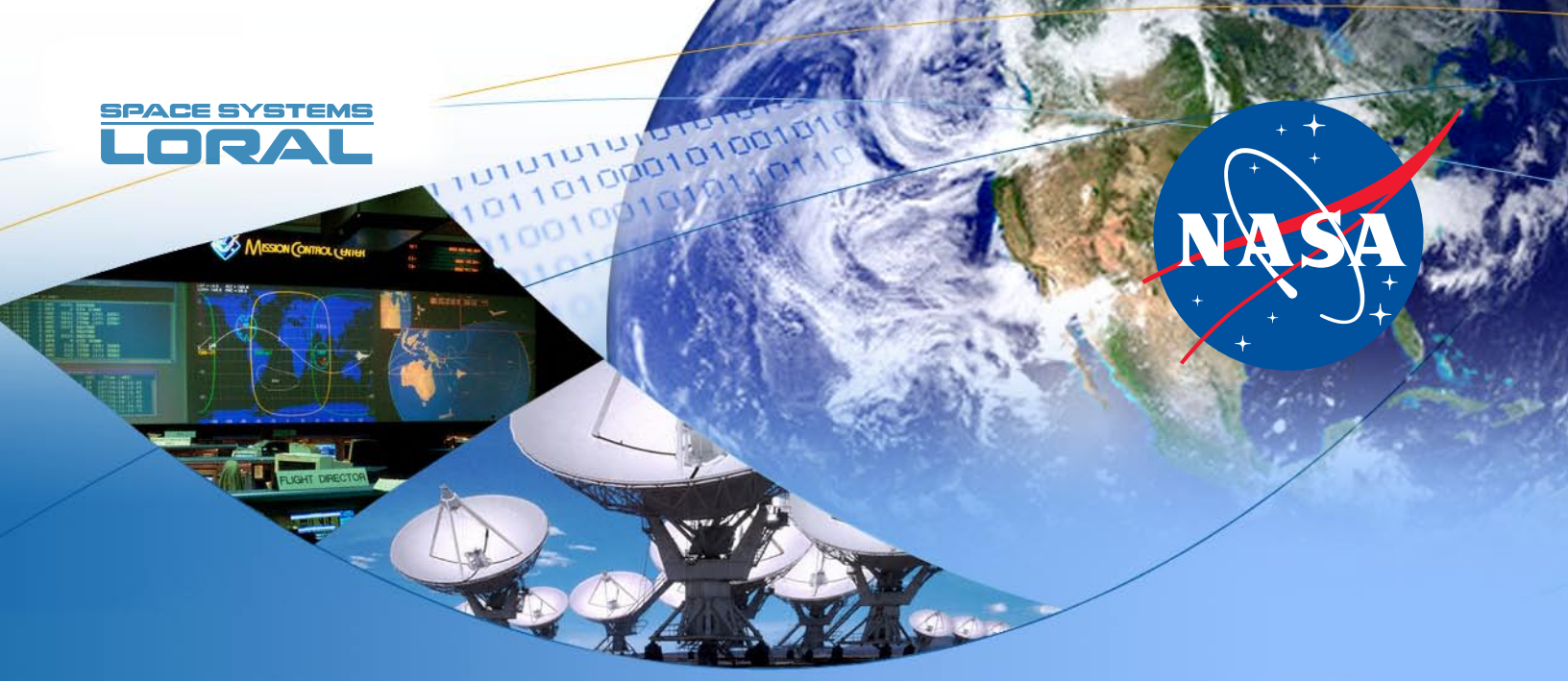
SPACE SYSTEMS
LORAL

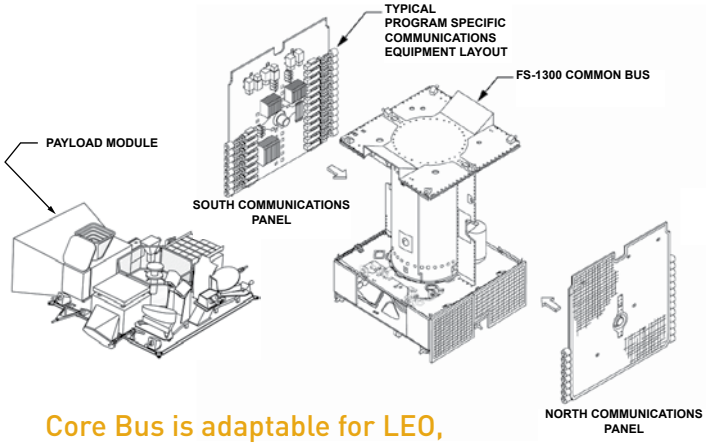


1300 Spacecraft Bus for RSDO Applications

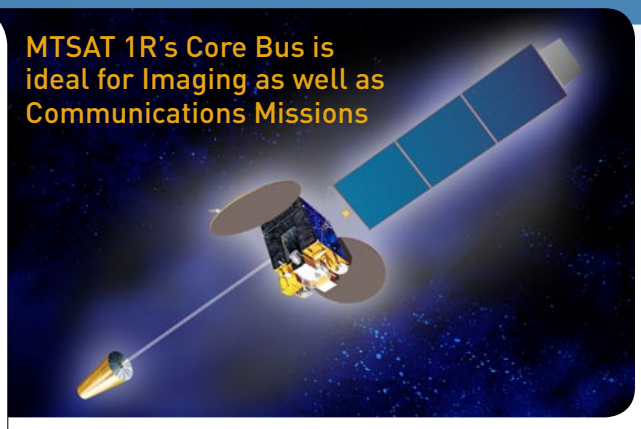
MISSION HERITAGE

SS/L's RSDO offering is based on the MTSAT-1R spacecraft which is a mission specific application of the highly reliable 1300 spacecraft product. SS/L's 1300 spacecraft have over 350 years of Geo-stationary experience, with more than 50 satellites currently in operation. MTSAT-1R is a dual mission satellite for the Japanese Civil Aviation Board and the Japanese Meteorological Agency and is performing air traffic control, navigation, and meteorological missions. This spacecraft, launched in 2005, is fulfilling a 10 year mission life at 140° East longitude in Geo-stationary orbit. This high reliability, long life, and low jitter bus supports MTSAT-1R's RF payloads for air-traffic management and an actively cooled visible and infrared imager for synoptic meteorological data collection. Meteorological imagery and data from MTSAT-1R are used by an international user community for sea surface temperature measurements, cloud top temperature, upper level winds, typhoon tracking, volcanic ash detection, and general weather predictions. Our RSDO core bus is a copy of this spacecraft at all levels excluding the Communication, Navigation and Imager payloads.

This RSDO 1300 spacecraft can support a wide range of missions and payloads individually or simultaneously. SS/L's 1300 spacecraft are designed to achieve long, reliable, orbital life through use of bi-propellant propulsion and momentum-bias systems for efficient stationkeeping, extremely high pointing accuracy, and orbital stability. A system of high-efficiency solar arrays and lightweight batteries provide uninterrupted electrical power. This spacecraft can support payloads up to 500 kg, while maintaining system performance and reliability. Variants of the 1300 bus can host larger payloads.



Core Bus is adaptable for LEO, HEO and GEO Imaging Missions



MTSAT 1R's Core Bus is ideal for Imaging as well as Communications Missions

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

SPACE SYSTEMS LORAL

1300 Spacecraft Bus for RSDO Applications

Instrument accommodation flexibility

The large instrument mounting panel is supported to the remainder of the core structure through the rigid and thermally stable CFRP central cylinder. This aluminum honeycomb instrument panel measures approximately 2.4 x 2.2 meters, and is suitable for mounting either forward or side looking imaging instruments with clear thermal radiator and optical fields of view. Payload equipment can be located inside the structural box to facilitate thermal protection. Antennas can be fixed or deployable, ranging in size up to 12 meters in diameter.

Payload mass, power and volume capacities

The maximum specified mass of the space segment payload, including electronics, is >500 kilograms. An orbit average power 1962 watts is supplied, with peaks to 2304 watts, regulated at 42 Volts with 28 Volts also available. Although dependent on mission requirements, the total payload sensor module footprint on the instrument panel is nominally 2.4 m x 2.2 m with a nominal instrument height of 3.1 meters.

Attitude Control Architecture

The Attitude Determination and Control Subsystem (ADCS) uses reaction wheels, trim tab, and magnetic torquers for normal on-orbit pointing and momentum management. On-board feedback motion compensation is used as part of the image navigation processing. Chemical bi-propellant thrusters are used for stationkeeping, momentum management, and de-orbiting maneuvers.

Communication and data handling capability

The high reliability Spacecraft Control Electronics Subsystem (SCE) architecture uses dual redundant 1750A processors, (BAE 750 Processor optional), MIL-STD-1553, and RS-485 serial data buses and has flown on more than 50 SS/L missions.

Launch vehicle compatibility and orbit capability

The RSDO Core bus, MTSat-1R, was launched into geostationary transfer orbit by an H2-A rocket from Tanegashima, Japan. The core 1300 bus is compatible with all major launch vehicles; it has also been launched aboard Ariane, Atlas V, Proton, and Sea Launch rockets.

Baseline delivery schedule

The 1300 bus has been in continuous production for more than 15 years. SS/L regularly delivers the 1300 bus in less than 18 months from ATP, ready for instrument integration and subsequent observatory performance and verification testing. Multiple buses in a series order can be delivered on 3 month centers.

Technical Specifications	
Payload Accommodation Features	
Payload Mass Limit	500 Kilograms
Payload Power	1962 Watts orbit average at 10 yrs.
Payload Pointing	Roll 83. Pitch 137, Yaw 90 arc-sec.
Payload External Volume	Nominal: 2.4m x 2.2m x 3.1m high
Payload Internal Volume	4 sections, ea. 2.4m x 1.2m x .31m
Bus Features	
Attitude Control	
Stability Mode	3 axis, dual redundant momentum bias
Pointing Knowledge	32 arc-sec each, Roll, Pitch, Yaw
Pointing Control	83 arc-sec Roll, 137 Pitch, 90 Yaw
Pointing Stability (Jitter)	3.6 arc-sec/sec, 3σ
Command & Data Handling	
Architecture	1750 Processor, MIL-STD-1553B, RS485
Downlink Formats	NRZ-L PCM PSK on subcarrier
Downlink Band	S-Band
Power	
Bus Voltage	41.5 to 42.5 volts, regulated
Battery	NiH2 178 Amp hour
Solar Array	Triple Junction GaAs/19 m^2
Propulsion	
Type	Chemical Bi-propellant
Propellant Capacity	2216 Kilograms
Max Delta V	4073 meters/sec
Structure	
Structure	Composite & Al honeycomb
Bus Dry Mass (w/o payload)	852 Kilograms
Lowest Structural Mode	14.2 Hz lateral, 35 Hz longitudinal
Compatible Launch Vehicle(s)	H-2A, Altas V, Delta IV, Ariane V, Sea Launch
Reliability/Survivability	
Probability of Success	>0.88 for 10 years
Radiation Tolerance	15-100 Kilorads Total Dose
Single Event Upsets	<1 critical upset/300years
Program Features	
Heritage Mission(s)	MTSAT-1R, 52 others
Nominal Orbit	GEO Synchronous
Types of Orbits available	Highly elliptical earth orbit
Nominal Schedule	Bus:18 months; Observatory:30 months
Certifications	ISO 9001:2000 and AS9100 certified.

For more information contact:
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