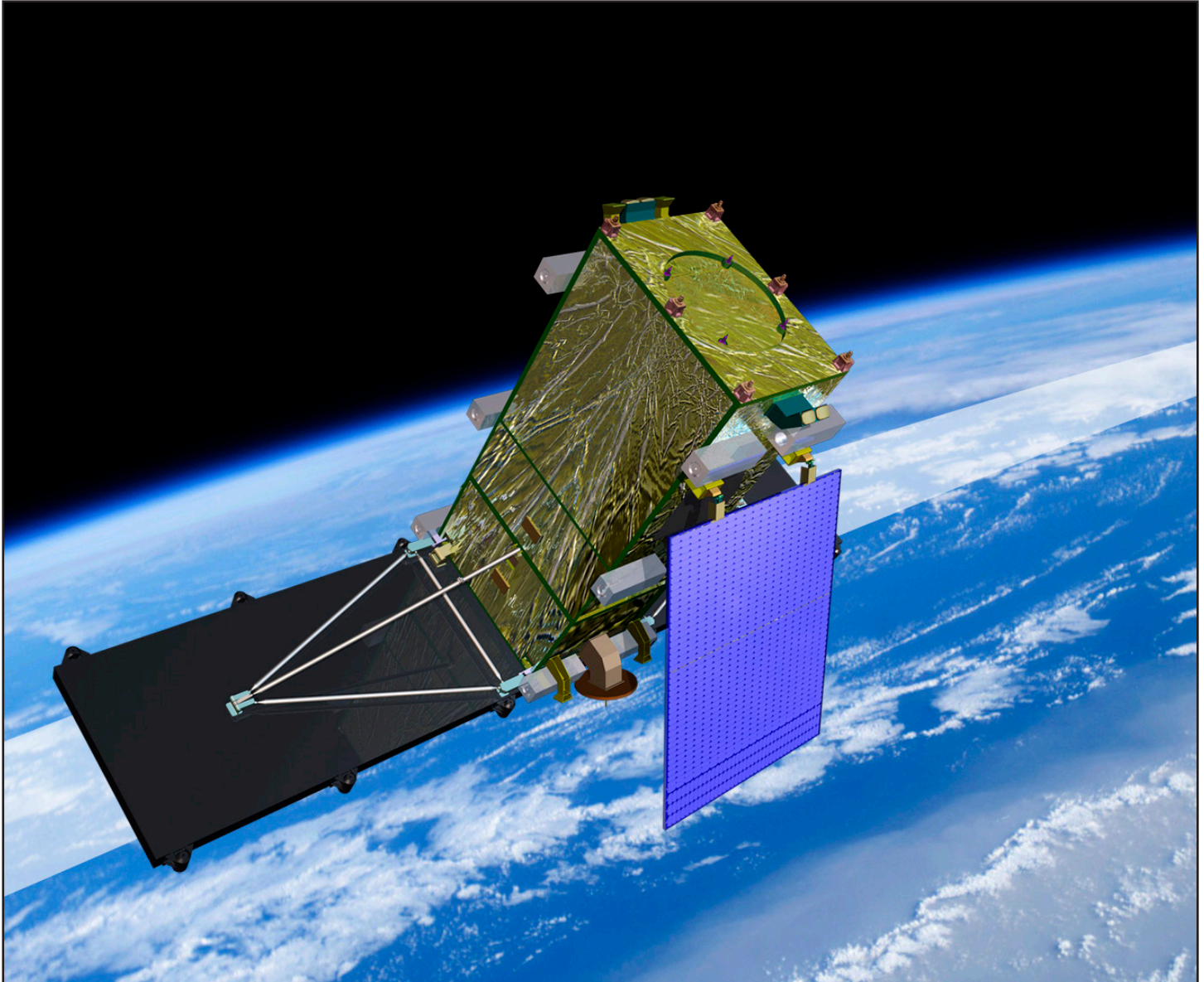
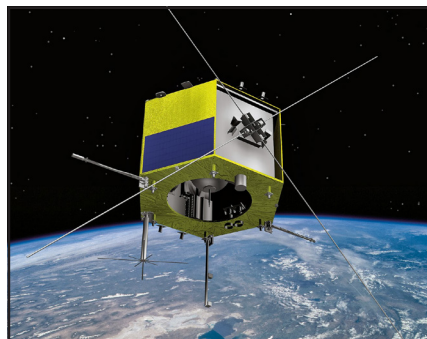
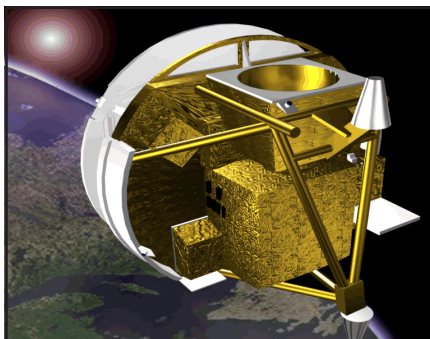


MAGELLAN SATELLITE BUSES



SCALABLE ARCHITECTURE • HIGH RELIABILITY • FLIGHT-PROVEN DESIGNS



OVERVIEW

Magellan Aerospace offers a family of spacecraft bus solutions consisting of the microsatellite-class MAC-100 and the smallsat-class MAC-200. The MAC-100 was developed for the SCISAT-1 mission launched in 2003. This bus is targeted at low Earth orbit (LEO) missions with design lifetimes on the order of two years. The MAC-200 has a flexible, fully redundant cross-strapped architecture with standard interfaces that can be tailored to meet mission-specific requirements and targeted life-cycle costs, while providing high reliability for mission lifetimes of seven years or more. Magellan has NATO Secret facility clearance, is registered under the Joint Certification Program (JCP) of the U.S. Defence Logistics Agency, and is eligible for the Canadian exemption under ITAR Part 126.5.

	MAC-100 Microsatellite Bus	MAC-200 Satellite Bus
Spacecraft Specifications		
Bus Dry Mass (without payload)	100 kg	Up to 1,000 kg (mission dependent)
Bus Power (without payload)	32 W (orbit average)	Up to 200 W (orbit average, typical)
Solar Array Power	110 W (BOL orbit average)	>1,000 W (scalable)
Solar Array Configuration	Body-fixed	Body-fixed or deployed
Redundancy	Single-string	Dual-string
Bus Reliability	0.84 at 2 years	0.89 at 7 years
Design Lifetime	2 years	7+ years
Flight Heritage	SCISAT-1 (on-orbit since 2003)	CASSIOPE (on-orbit since 2013) RADARSAT Constellation Mission (launched June 2019)
Payload Accommodations		
Mass	50 kg	Up to 530 kg (mission dependent)
Volume	0.12 m ³	Mission dependent
Power	65 W average, 100 W peak	500 W average, 2 kW peak (scalable)
Voltage	28±6 V _{DC} (unregulated)	28±6 V _{DC} (unregulated)
Data Interface	RS-422 @ 4 Mbps	RS-422 @ 4 Mbps, CAN @ 1 Mbps
Data Storage	1.5 GB	2.0 GB (expandable)
Guidance, Navigation and Control (GNC)		
ADCS Architecture	3-axis, bias momentum	3-axis, zero momentum
Attitude Knowledge (3σ)	<0.02° (pitch/yaw), <3° (roll) with Sun sensor and magnetometer	<0.007° (bias, all axes)
Attitude Control (3σ)	<0.2° (pitch/yaw), <3° (roll) with Sun sensor and magnetometer	<0.011° (bias, all axes)
Pointing Performance	<240 arcsec	<20 arcsec
Propulsion	None	Hydrazine monopropellant
Command and Data Handling (C&DH)		
TT&C Protocol	CCSDS and STDN compatible	CCSDS and STDN compatible
Command Uplink	S-band, 4 kbps (CCSDS compliant)	S-band, 4 kbps (CCSDS compliant)
Telemetry Downlink	S-band, 4 Mbps (CCSDS compliant) Reed-Solomon encoding (optional)	S-band, 4 Mbps (CCSDS compliant) Reed-Solomon and Convolutional encoding (optional)

ABOUT MAGELLAN AEROSPACE

Magellan Aerospace is a global aerospace company that provides complex assemblies and systems solutions to aircraft and engine manufacturers, and defence and space agencies worldwide. Magellan designs and manufactures aeroengine and aerostructure assemblies and components for aerospace markets, advanced proprietary products for military and space markets, and provides engine and component repair and overhaul services worldwide. Magellan is a public company whose shares trade on the Toronto Stock Exchange (TSX: MAL), with operating units throughout North America, Europe, and India.

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