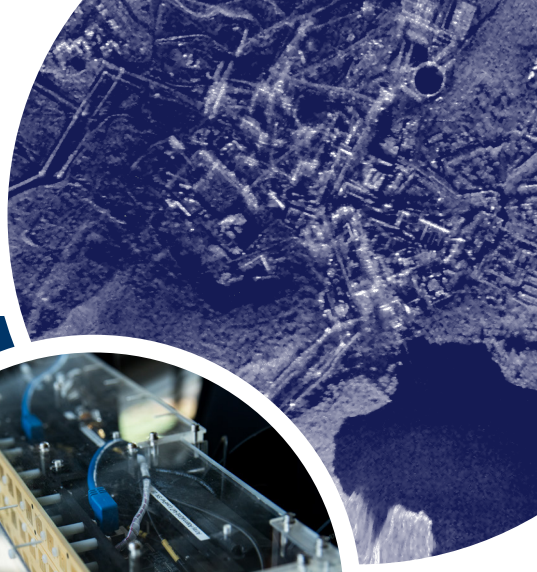
SOUTH AFRICA'S FIRST SAR SATELLITE DEVELOPMENT



Significant development performed by the CSIR and Dragonfly Aerospace on the satellite concept for a locally developed SAR satellite solution.

The CSIR, in partnership with Dragonfly Aerospace and Space Commercial Services, is developing the technology for a C-band, phased-array, synthetic aperture radar as payload for a LEO satellite. The development has been funded by the Department of Science and Innovation up to this point.

The payload (named SAR-C) is designed to support constellation designs for satellites in the micro satellite class while providing advanced SAR performance modes, including high-resolution wide-swath digital beamforming. The design boasts significant redundancy and lowered manufacturing costs due to the highly scalable architecture.

Development is in the engineering model phase, with airborne flight tests of scaled arrays completed, showing excellent SAR imaging performance. Significant engineering design has been completed regarding performance modelling, subsystem and system-level design and prototyping of receiver, exciter, digital and phased array components.

On the satellite bus side, the design is intended for use with SAR satellite buses capable of providing > 2.5 kW of power to the payload and supporting around 150 kg of payload mass.

The SAR-C payload design is intended for use in the FleetSAR constellation and is under development in partnership with Space Commercial Services and other South African entities.

SAR Satellite Benefits

A SAR Satellite is the only sensor capable of imaging during the day or at night, irrespective of weather conditions such as rain or cloud cover and through obscurants. It can also provide additional information through modes such as interferometry and polarimetry, adding information that cannot be sensed optically.

Applications of SAR imagery include:

- Maritime domain monitoring: Vessel detection, identification and tracking, trade route monitoring and traffic forecast, monitoring for illegal fishing, etc.;
- Agri monitoring: Soil moisture and physical crop properties monitoring, forestry inventory, health and illegal logging monitoring;
- Disaster monitoring and management: E.g., flooding and/or fire monitoring, infrastructure rebuild monitoring; and
- Infrastructure monitoring: E.g., cartography, digital elevation mapping, transport/ infrastructure planning and subsidence and environmental impact monitoring.

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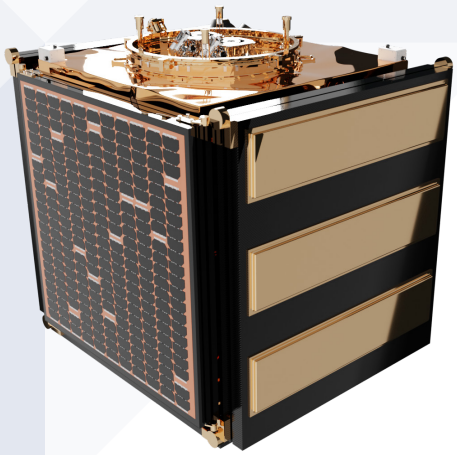
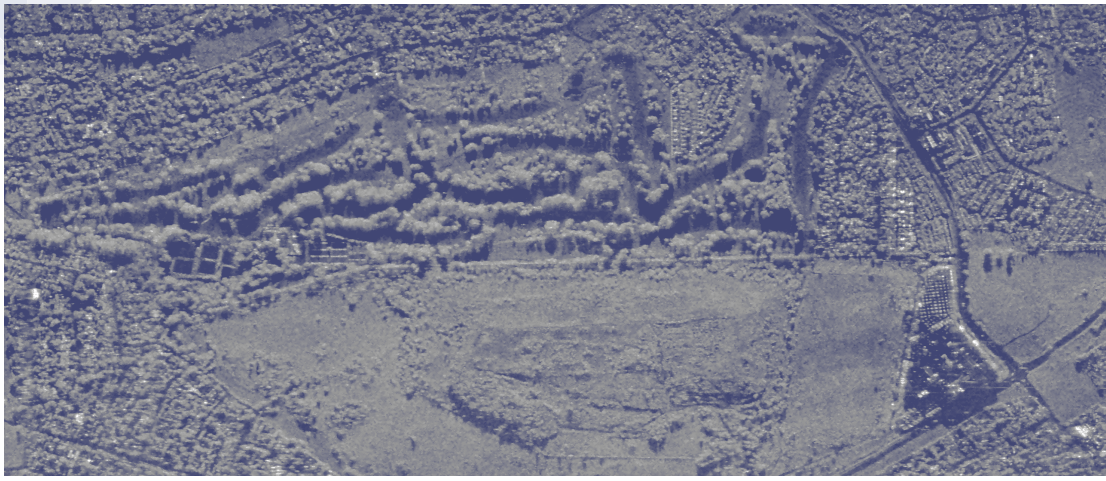
SCS space

DRAGONFLY aerospace

DRAGONFLY-C SAR SATELLITE SPECIFICATIONS

Operational Lifetime	5 years, Payload and Avionics fully redundant					
Operating Band	C-band (5.5 GHz)					
Bandwidth	Up to 600 MHz1 (0.25m range resolution)					
Polarisation	Single Pol (1st generation) Quad Pol (VV, VH and HV, HH pulse to pulse) (by 2nd generation)					
Peak Transmit Power	Up to 16 kW (up to 18% duty cycle)					
Imaging Time per Orbit	Up to 5 min2					
Imaging Modes (Resolution/ Swath)	**Spotlight**	**Sliding Spotlight**	**Stripmap**	**Stripmap Wide**	**ScanSAR 100**	**ScanSAR 300**
	0.5 - 1.5 m	1 - 2 m	3 m	5 m	10 - 15 m	25 - 30 m
	10 x 10 km	20 x 20 km	20 - 44 km	60 - 80 km	100 km	300 km
Extended Imaging Modes to allow further R&D	VideoSAR, Online and Real-time Processing Modes, MTI, MIMO Modes					
Mass	Satellite Dry Mass	< 350 kg				
	Bus	< 165 kg				
	Payload	< 185 kg				
Downlink Capacity per Orbit	Entire imaging session per orbit (full 5 min imaging per orbit)					





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