



Image credit: DarkCarb render 2019. Credit: SSTL

# DARKCARB

DarkCarb is a high resolution mid-wave infrared (MWIR) imaging satellite which can produce thermal data with a comparable resolution to any currently available capability, at a tenth of the spacecraft mass.

DarkCarb is based on the SSTL Carbonite platform and makes use of a 0.32m diameter telescope and a Mercury Cadmium Telluride (MCT) cooled detector. One of the main benefits of this design is the ability to image throughout both the day and the night with no sensitivity to lighting conditions. As the imaging capability is not dependent on illumination conditions, non-SSO orbits can also be considered.

## Applications

Suitable for a wide variety of commercial, civil and security applications:

- Change detection and human activity
- Pattern of life assessments
- Humanitarian and disaster management
- Global high resolution situational awareness
- National security and defence
- Infrastructure and asset monitoring
- Urban heat mapping

DarkCarb imagery provides the capability to differentiate between objects and surfaces of different temperature and emissivity, providing complementary information to traditional optical imagery and the ability to extend imaging opportunities into night time.

DarkCarb's video capability allows for change detection in a single pass. In addition, as the imager can detect temperature differences it should be possible to derive information on recent activity in a scene, such as recently used or moved vehicles, which is not normally discernible in Visible-NIR imagery. DarkCarb also has the potential to assist with disaster support activities; wildfires, volcanic eruptions and flooding for example.

## Payload

Parameter	Specification
GSD	4m
Swath	4km
Spectral bands	MWIR (3.7-4.95 $\mu$ m)
Throughput	~30GB (SSTL GSN)

## Platform

Parameter	Specification
Reference orbit	500km SSO with 10:30 LTAN
Mission lifetime	5 Years
Launch mass	130kg
Data storage	120GB
Downlink	140Mbps