List of Resources

Version 2.9

2024

Cameras

Loft Orbital offers access to a set of in-orbit imagers.

A customer can task the satellite to generate images and then downlink the data, with the option to use onboard processing.

Panchromatic

ID	Spectral bands	GSD	Swath
Y3-CAM	Panchromatic VNIR	4.75 m	19 km

Multispectral VNIR

ID	Spectral bands	GSD	Swath
Y7-CAM-1	7 bands in VNIR	30 m	120 km

Thermal Infrared

ID	Spectral bands	GSD	Swath
Y7-CAM-2	2 bands in LWIR	71 x 235 m	72 km

Hyperspectral VNIR

ID	Spectral bands	GSD	Swath
Y6-CAM	150 bands in VNIR	10 m	20 km
Y8-CAM	32 bands in VNIR	4.75 m	20 km

OPTICAL SENSORS

Y3-CAM

Panchromatic Imager

Snapshot

1 band – Panchromatic

VNIR 470 nm to 900 nm

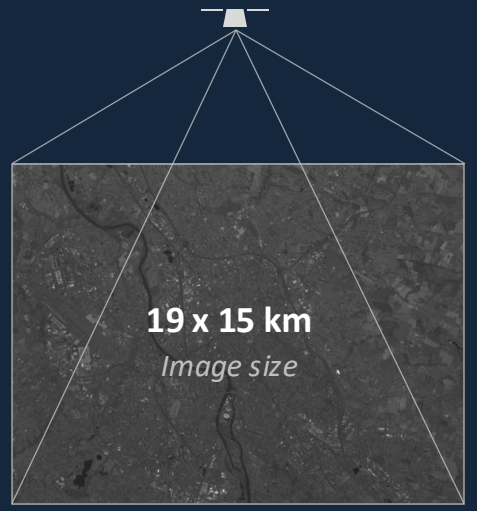
VISIBLE LIGHT

470 nm 900 nm

The swath and spatial resolution (GSD) values are given at 500 km altitude.

YAM-3

SSO 478 km



GSD 4.75 m

Spatial resolution

12 MB

Typical raw image file size

Data formats

- RAW
- CCSDS 122.0-B-2 lossless or lossy

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OPTICAL SENSORS

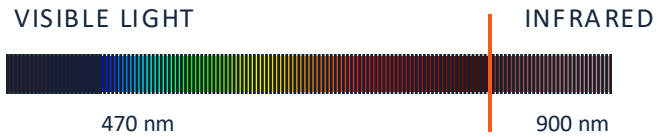
Y6-CAM

Hyperspectral Imager

Push Broom

150 bands – Hyperspectral

VNIR 470 nm to 900 nm

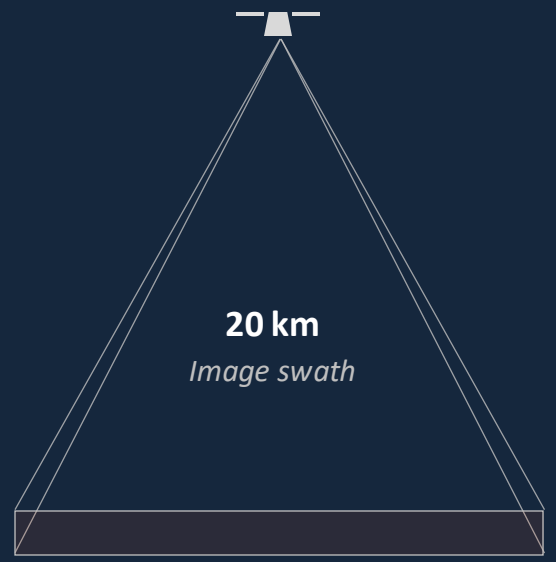


The band distribution is an illustration and may not be fully representative.

The swath and spatial resolution (GSD) values are given at 500 km altitude.

YAM-6

SSO 500 km



GSD 10 m

Spatial resolution

From 1 to 24 MB/km

Per along-track length

Data formats

- RAW
- JPEG2000 – lossless or lossy
- Possible onboard L1B

Post-process available

- dTDI
- Binning
- FMC guidance

OPTICAL SENSORS

Y7-CAM-1

Multispectral Imager

Push Broom

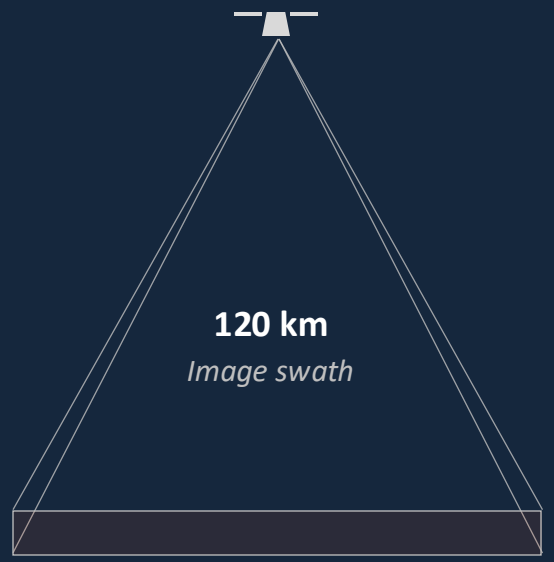
7 bands – Hyperspectral

VNIR 470 nm to 900 nm

The swath and spatial resolution (GSD) values are given at 500 km altitude..

YAM-7

SSO 507 km



GSD 30 m

Spatial resolution

From 0.1 to 2 MB/km

Per along-track length

Data formats

- RAW
- JPEG2000 – lossless or lossy

Post-process available

- dTDI
- Binning
- FMC guidance

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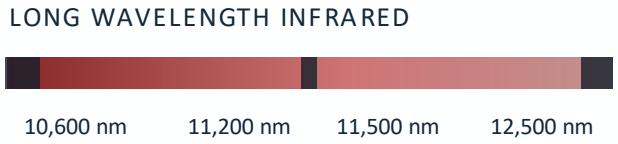
OPTICAL SENSORS

Y7-CAM-2

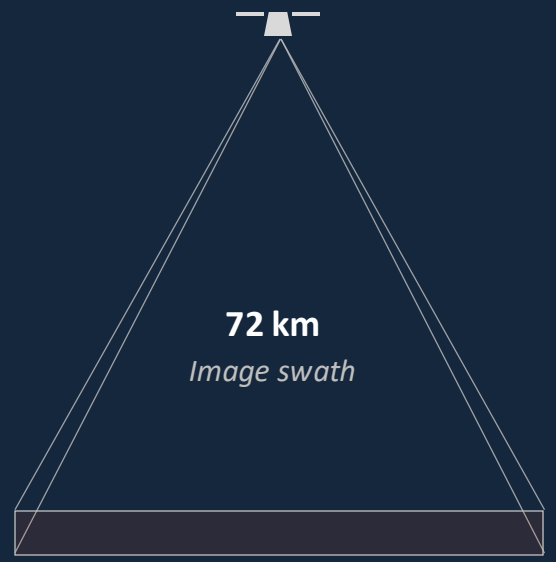
Thermal Infrared Imager

Push Broom

2 bands – Multispectral
LWIR 10,600 nm to 11,200 nm
LWIR 11,500 nm to 12,500 nm



YAM-7
SSO 500 km – 550km



GSD 71 m x 235 m
Spatial resolution
(Cross Track x Along Track)

From 4 MB/km
Per along-track length

The swath and spatial resolution (GSD) values are given at 525 km altitude.

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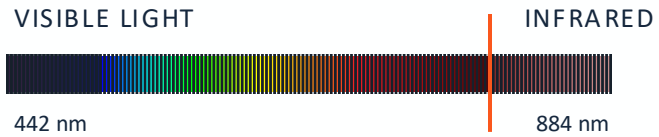
OPTICAL SENSORS

Y8-CAM

Hyperspectral Imager

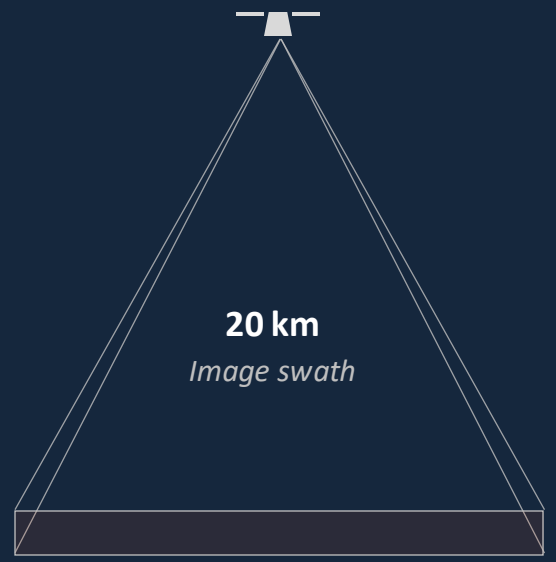
Push Broom

32 bands tunable *(1 nm accuracy)*
– Hyperspectral
VNIR 442 nm to 884 nm



The band distribution is an illustration and may not be fully representative.
The swath and spatial resolution (GSD) values are given at 500 km altitude.

YAM-8
SSO 500-600 km



GSD 4.75 m
Spatial resolution

From 1 to 40 MB/km
Per along-track length

Data formats
- RAW
- CCSDS 122.0-B-2 lossless or lossy

Post-process available
- dTDI
- Binning
- FMC guidance

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Radiofrequency - Reception

Loft Orbital offers access to the capabilities of a software-defined radio, allowing listening to a diverse range of frequencies.

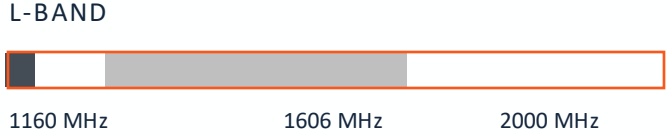
Y3/6/Y8-RFR-1

RX L Band

- Positioning, Navigation and Timing
- Jammer detection

GNSS Bands

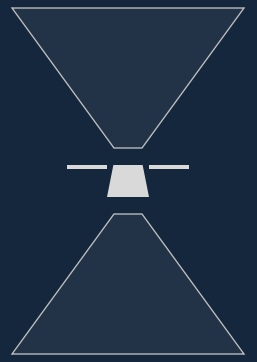
1160 – 1606 MHz



Zenith Coverage

YAM

SSO 500 - 600 km



Earth coverage

(only on Y3 and Y6)

Available GNSS Bands

GPS - L1 L2 L5

GLONASS - G1 G2 G3

Galileo - E1 E5a E5b E6

BeiDou - B1 B2 B2a B3

Figure of Merit

G/T > -28 dB/K peak

Gain-to-noise-temperature

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

Spectral analysis

16,384 points FFT

Recording campaigns of several hours

Maximum bandwidth: 15 MHz

Additional features

Integration of customer software IP acceleration

Y3-RFR-2

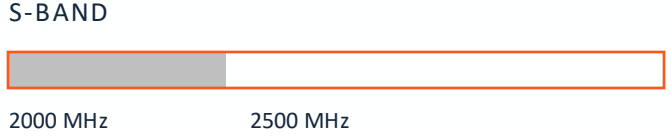
Rx S Band

Internet of Things

Signal Intelligence

S-Band

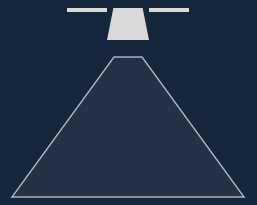
2000 – 2500 MHz



The Center frequency and bandwidth are tunable anywhere within payload's available frequency range.

YAM

SSO 500 - 600 km



Earth coverage

Figure of Merit

G/T > -25 dB/K peak

Gain-to-noise-temperature

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

Spectral analysis

16,384 points FFT

Recording campaigns of several hours

Maximum bandwidth: 15 MHz

Additional features

Integration of customer software IP acceleration

Y6-RFR-2

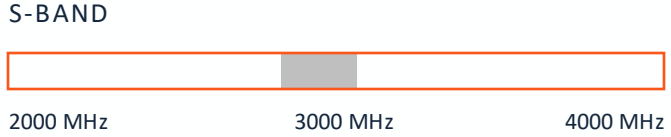
Rx S Band

Maritime Radar

Signal Intelligence

S-Band

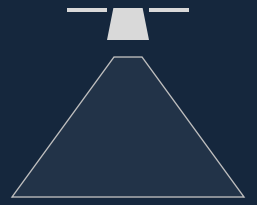
2900 – 3100 MHz



The Center frequency and bandwidth are tunable anywhere within payload's available frequency range.

YAM

SSO 500 - 600 km



Horizon coverage

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

(No LNA in chain)

Spectral analysis

16,384 points FFT

Recording campaigns of several hours

Maximum bandwidth: 15 MHz

Additional features

Integration of customer software IP acceleration

Y8-RFR-2

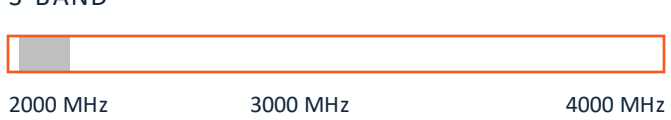
Rx S Band

Internet of Things

Signal Intelligence

S-Band

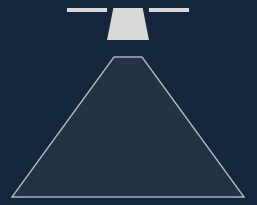
2060 – 2110 MHz



The Center frequency and bandwidth are tunable anywhere within payload's available frequency range.

YAM

SSO 500 - 600 km



Earth coverage

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

Spectral analysis

16,384 points FFT

Recording campaigns of several hours

Maximum bandwidth: 15 MHz

Additional features

Integration of customer software IP acceleration

Y3-RFR-3

Rx UHF

- Communication & signal intelligence
- Aircraft system monitoring

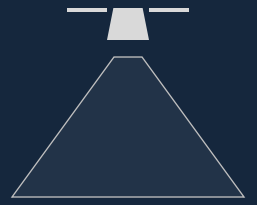
UHF-Band

865 – 924 MHz

The Center frequency and bandwidth are tunable anywhere within payload's available frequency range.

YAM

SSO 500 - 600 km



Earth coverage

Figure of Merit

G/T > -25 dB/K peak

Gain-to-noise-temperature

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

Additional features

Integration of customer software IP acceleration

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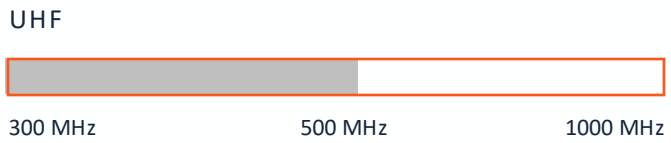
Y6-RFR-3

Rx UHF

- Communication & signal intelligence
- Aircraft system monitoring

UHF-Band

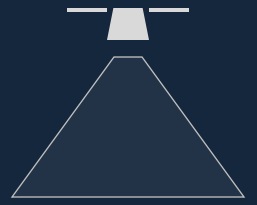
300 – 500 MHz



The Center frequency and bandwidth are tunable anywhere within payload's available frequency range.

YAM

SSO 500 - 600 km



Earth coverage

Figure of Merit

G/T > -23 dB/K peak

Gain-to-noise-temperature

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

Spectral analysis

16,384 points FFT

Recording campaigns of several hours

Maximum bandwidth: 15 MHz

Additional features

Integration of customer software IP acceleration

Y6-RFR-4

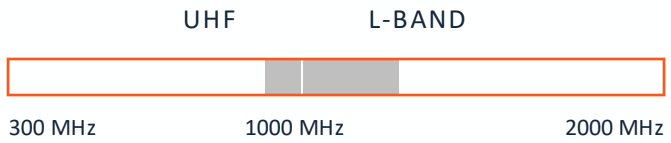
Rx UHF

Communication & signal intelligence

Aircraft system monitoring

UHF-Band

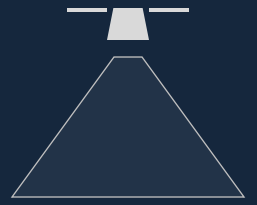
840 – 1200 MHz



The Center frequency and bandwidth are tunable anywhere within payload's available frequency range.

YAM

SSO 500 - 600 km



Earth coverage

Figure of Merit

G/T > -21 dB/K peak

Gain-to-noise-temperature

I/Q recordings

0.4 MHz bandwidth: max ~ 10 minutes length

4 MHz bandwidth: max ~ 20 seconds length

Spectral analysis

16,384 points FFT

Recording campaigns of several hours

Maximum bandwidth: 15 MHz

Additional features

Integration of customer software IP acceleration

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Hub Gateway

Loft provides ways to exchange data with the spacecraft using other means than the usual ground station uplink and downlink.

HUB GATEWAY

Y6-HGW

GEO Backhaul Data Relay

Leveraging the inmarsat Intersatellite Data Relay Service (IDRS)

Low latency data delivery

Coverage

From -60° to +60° latitude

The IDRS provides a real-time two-way link between the ground and the satellite by relying on a GEO satellite relay.

Data-rate

Uplink up to 200 kbps

Downlink up to 200 kbps

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Hub Compute and Processing

Loft offers a new way to develop, test, and validate software applications for space systems, to then seamlessly deploy them to satellites in orbit using Loft's space infrastructure tools and platforms.

Here are some application examples of the onboard computing capabilities:

- Image processing
- Radiofrequency analysis
- Event detection and alert management

Y6-HCP

	YAM-6 **Y6-HCP-1**	YAM-6 **Y6-HCP-2**	YAM-6 **Y6-HCP-3**	YAM-6 **Y6-HCP-4**
CPU	5 CPU cores 2 GHz	5 CPU cores 2 GHz	3 CPU cores 1.2 GHz	1 CPU core 1.2 GHz
RAM	7 GB	7 GB	1 GB	256 MB
Storage	40 GB ephemeral 500 GB persistent	40 GB ephemeral 500 GB persistent	10 GB ephemeral 128 GB persistent	1 GB ephemeral 64 GB persistent
GPU	256 CUDA Cores 1.33 TFLOPS FP16	256 CUDA Cores 1.33 TFLOPS FP16	None	None

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Y7-HCP

	YAM-7 **Y7-HCP-1**	YAM-7 **Y7-HCP-2**	YAM-7 **Y7-HCP-3**
CPU	5 CPU cores 2 GHz	3 CPU cores 1.2 GHz	1 CPU core 1.2 GHz
RAM	7 GB	1 GB	256 MB
Storage	40 GB ephemeral 500 GB persistent	10 GB ephemeral 128 GB persistent	1 GB ephemeral 64 GB persistent
GPU	256 CUDA Cores 1.33 TFLOPS FP16	None	None

Y8-HCP

	YAM-8 **Y8-HCP-1**	YAM-8 **Y8-HCP-2**	YAM-8 **Y8-HCP-3**
CPU	5 CPU cores 2 GHz	3 CPU cores 1.2 GHz	1 CPU core 1.2 GHz
RAM	7 GB	1 GB	256 MB
Storage	40 GB ephemeral 500 GB persistent	10 GB ephemeral 128 GB persistent	1 GB ephemeral 64 GB persistent
GPU	256 CUDA Cores 1.33 TFLOPS FP16	None	None

Annexes

Glossary

Optics

- FPS — Frames per Seconds
- FWHM — Full Width at Half Maximum
- GSD — Ground Sample Distance
- LWIR — Long Wavelength Infrared
- MTF — Modulation Transfer Function
- RGB — Red Green Blue
- SNR — Signal-to-Noise Ratio
- TDI — Time Delay and Integration
- TIR — Thermal Infrared
- VNIR — Visible and Near Infrared

Loft Orbital Products

- YAM-x — Yet Another Mission (Satellite name)
- YAC-x — Yet Another Constellation (Constellation name)

Radiofrequency

- EIRP — Effective Isotropic Radiated Power
- GNSS — Global navigation satellite system
- G/T — Gain-to-Noise-Temperature
- I/Q — In-Phase and Quadrature Components
- RFFE — RF Front End
- SDR — Software Defined Radio

Compute

- FLOPS — Floating Point Operations
- FP16 — 16-bit Floating Point (aka Half Precision)
- ML — Machine Learning

Space Related

- FMC — Forward Motion Compensation
- SSO — Sun Synchronous Orbit


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