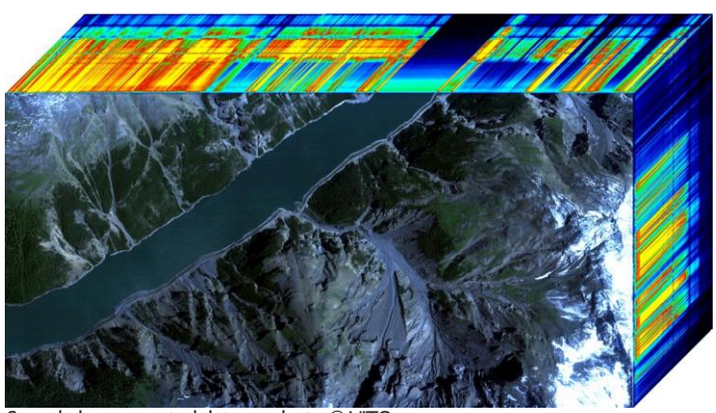
CHIEM-c

COMPACT HYPERSPECTRAL IMAGER

The **filter on chip based technologies**, developed within the CHIEM project (Compact Hyperspectral Imager Engineering Model), offer unique advantages:

- Compact and lightweight camera layout
- Combination of panchromatic and hyperspectral imaging on a single detector



Sample hyperspectral data product - © VITO

MATCHING THE SWEET SPOT FOR GLOBAL VEGETATION MONITORING

- **spatial resolution: <30m**

- **spectral resolution <10nm** needed for measuring key biophysical variables

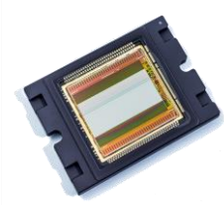
- **radiometric resolution**: SNR >100

- **temporal resolution** --> tunable in constellation

HYPERSPECTRAL IMAGING CHIP

Within the CHIEM project both frontside and backside illuminated hyperspectral detectors have been developed by imec.

Detector format (pixels)	4096 x 3072 (AMS CMV12000)
Pitch (µm)	5,5
Spectral Range (nm)	470-900
FWHM (nm)	5 - 10
Nr of spectral channels	154 (HYPER) - 1 (PAN)



VITO REMOTE SENSING

12U CUBESAT COMPATIBLE CAMERA SPECIFICATIONS

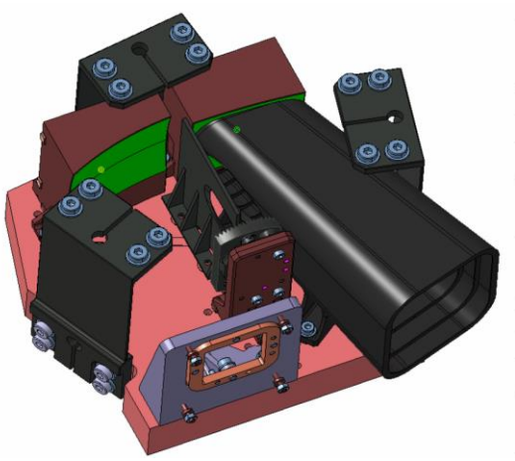
A fully reflective **Three Mirrors Anastigmat (TMA)** telescope is combined with a high speed camera supporting various flexible read-out schemes to exploit the unique properties of the CHIEM hyperspectral image sensor chip.

OPTICAL SYSTEM

F-number	f/4.5
Focal length	135 mm
Along track FOV	[-3.6°,+3.6°]
Across track FOV	[-4.75°,+4.75°]
Entrance Pupil	30 mm
Dimensions	210 x 223,5 x 133
Mass	4.0 kg

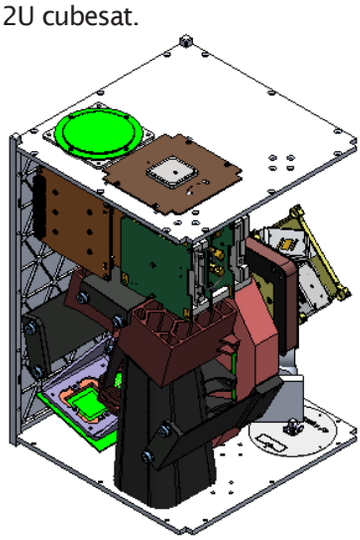
CAMERA READ-OUT ELECTRONICS

Max full frame rate in 10/12 bit [fps]	200/125
Dimensions read-out electronics	100 x95 x85 mm³
Frame dependent reconfgurable sensor set-up	up to 12ROI
Digital TDI	Bypass, 6, 12 stages
Power consumption	27 W
Architecture	Hybrid



ACCOMODATION STUDY

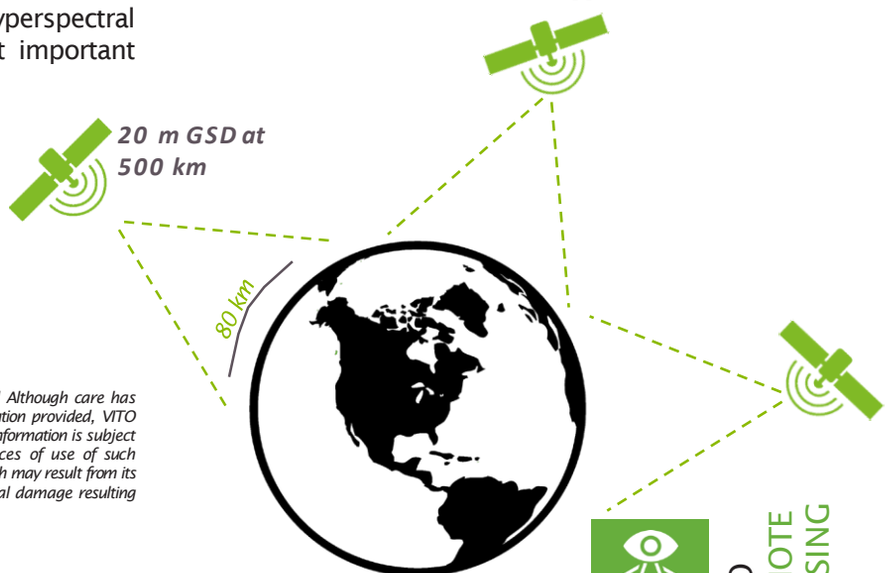
The compact hyperspectral instrument will be embarked in a 12U cubesat.



PRELIMINARY MISSION DEFINITION

Within the CHIEM-c project the outlines of an in orbit demonstration mission have been defined. This is a first step towards a constellation of compact hyperspectral instrument with a high revisit rate. The most important parameters are shown in the table below.

Orbit	SSO
Altitude	500 km
Revisit	7 d
Target GSD	20 m
Swath	80 km



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