

Infrared Platform for Earth Observation (China Space Station)

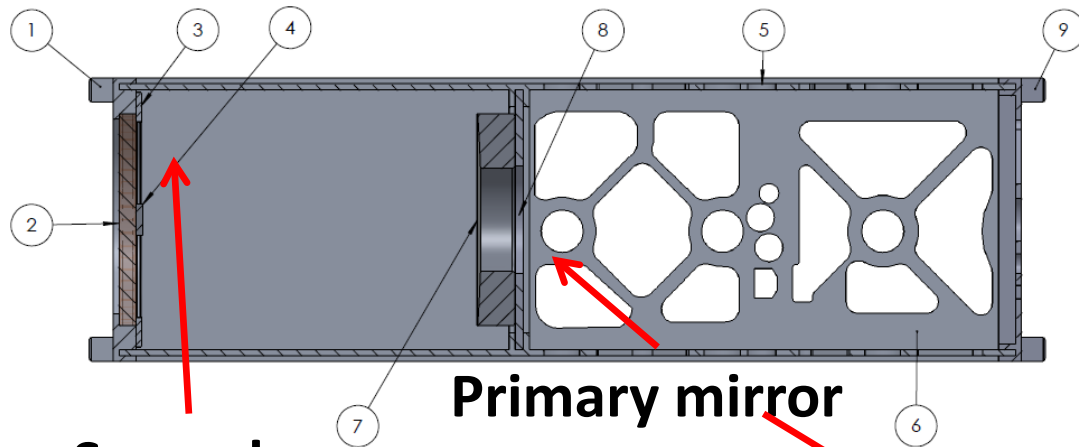
UNOOSA and China Manned Space Agency

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(INAOE), México



Previous Activities

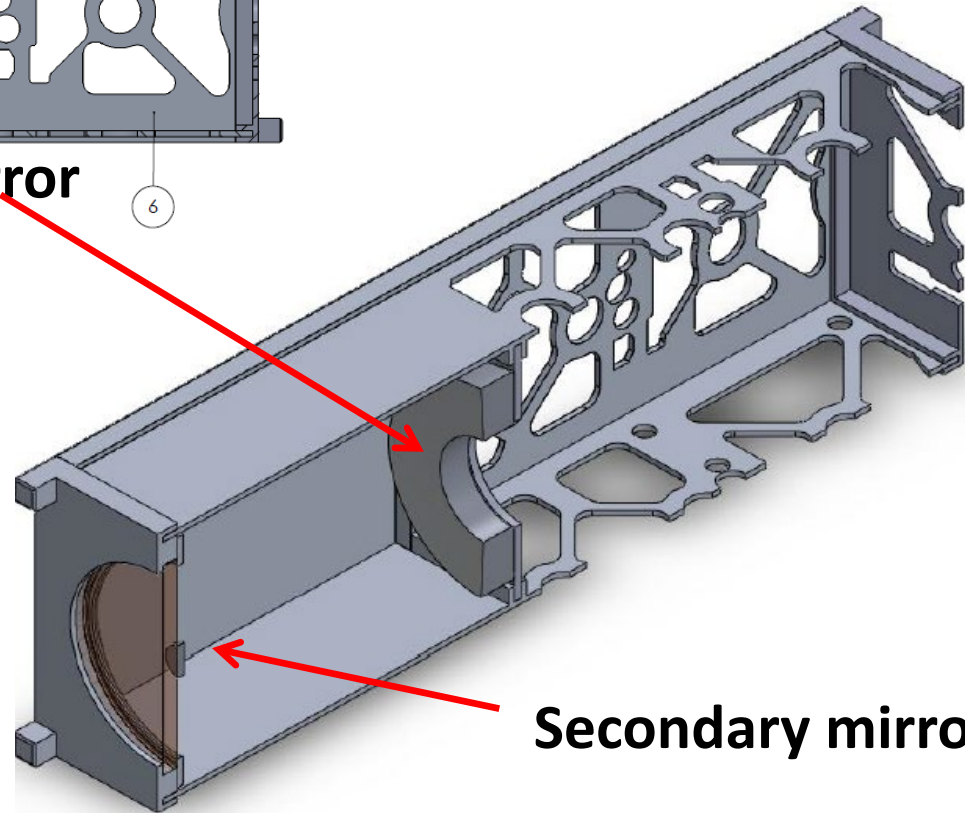
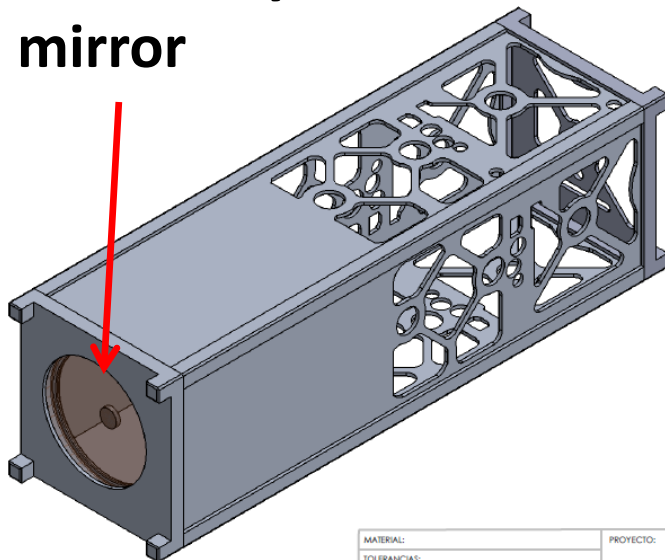
Design of Cubesat with a Telescope



Optics and mechanical support compatible to satellite standards

Secondary mirror

Primary mirror

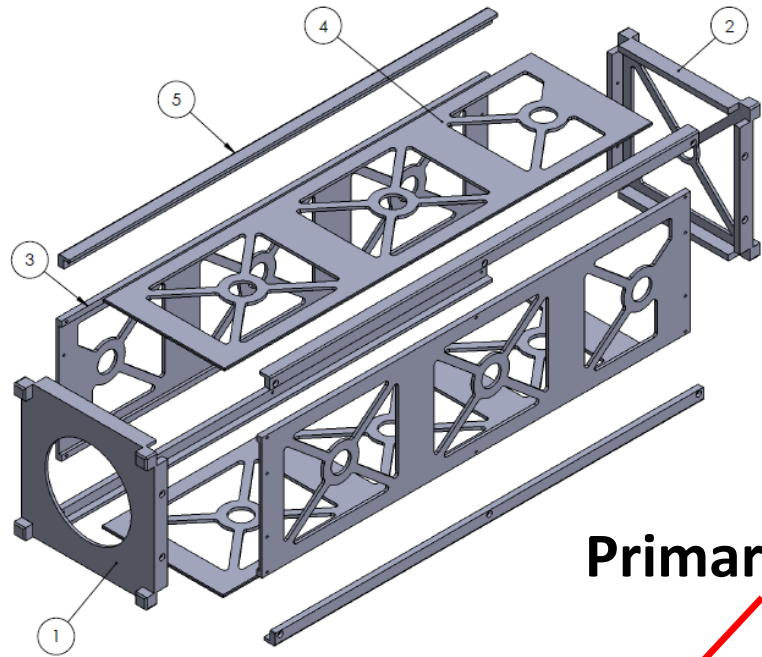


Secondary mirror

MATERIAL:	PROYECTO: S
TOLERANCIAS:	

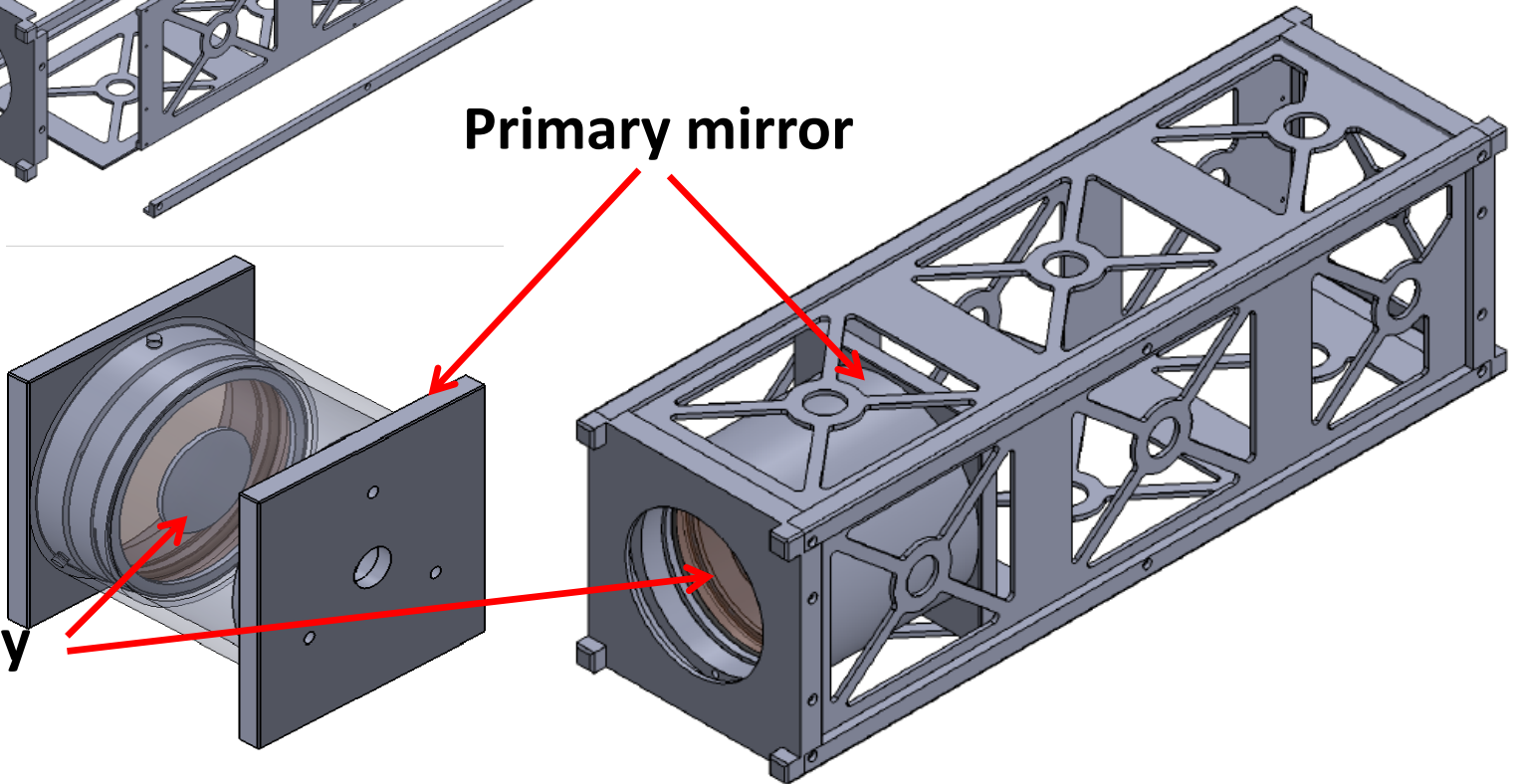
Designing criteria

Optics, mechanical support and electronics feasible to install with the satellite subsystems



Primary mirror

Secondary mirror



Prototypes of Cubesats to acquire practice

“2U”
10x10x20
(cm)

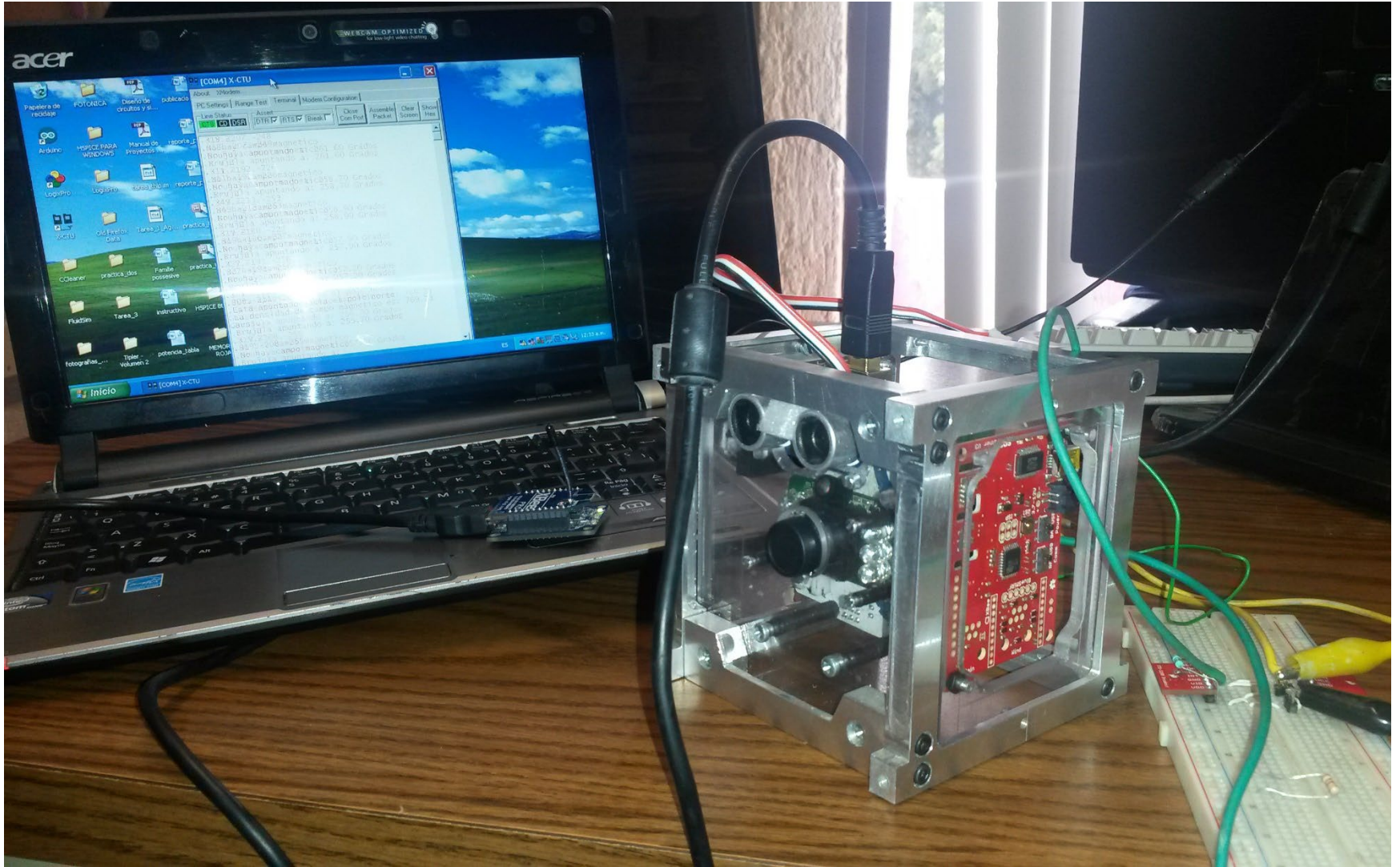


“1U”
10x10x10
(cm)



Testing sensors, cameras, electronics, optics, etc.

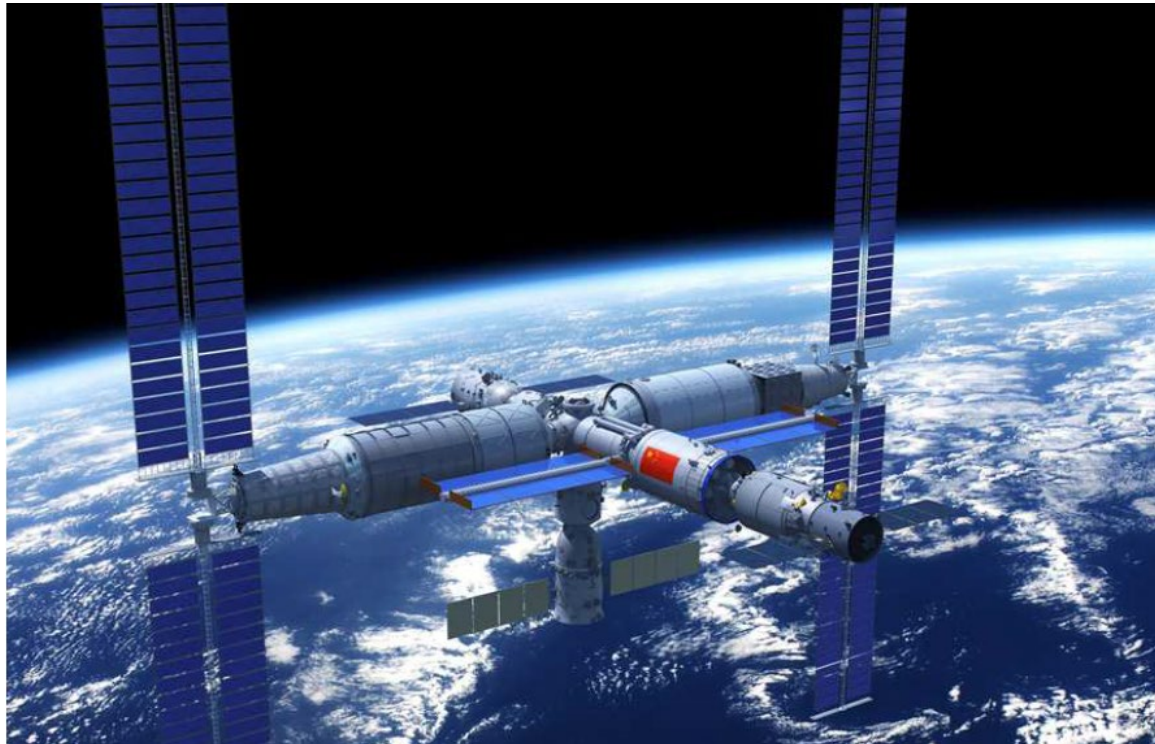
Prototype of Cubesat 1U



United Nations Office for Outer Space Affairs (UNOOSA) - China Manned Space Agency (CMSA)

China Space Station Tiangong (Heavenly Palace)

2018



UNOOSA- China Manned Space Agency (Call in 2018)

IR Platform for Earth Observation

It will be 6 months in operation

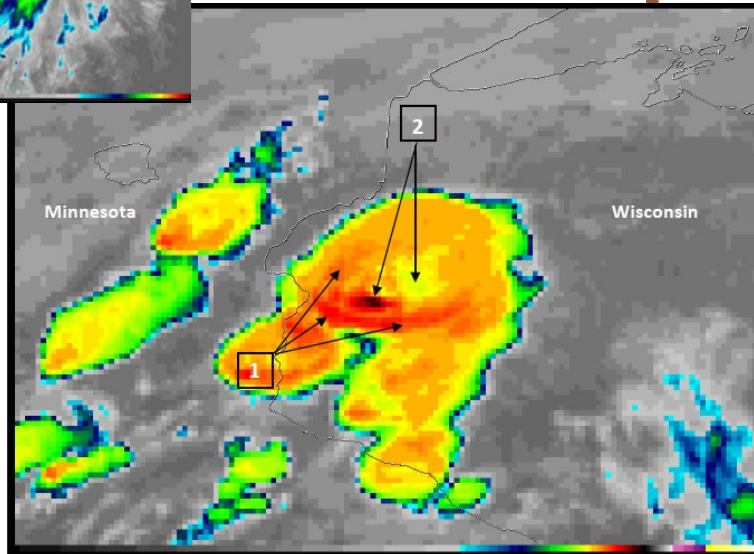
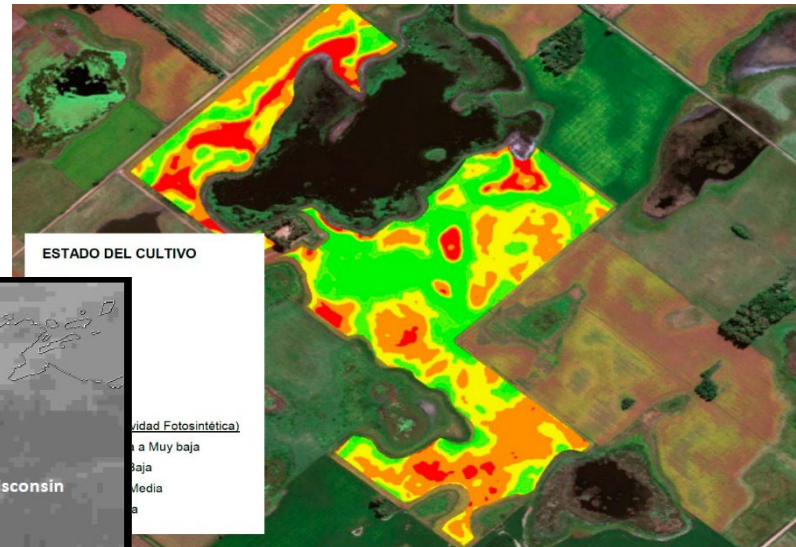
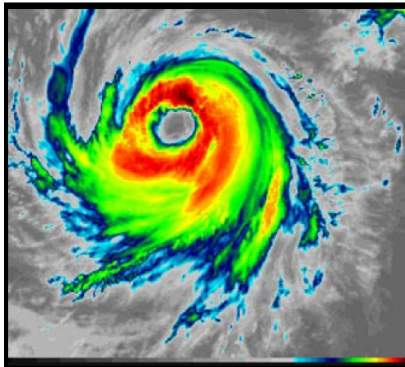
Objectives

Map the water vapor content in the atmosphere of Mexico.

Map the temperature of the territory of Mexico.

Hot Spot and Intense storms, study conditions.

Cloud and land observation

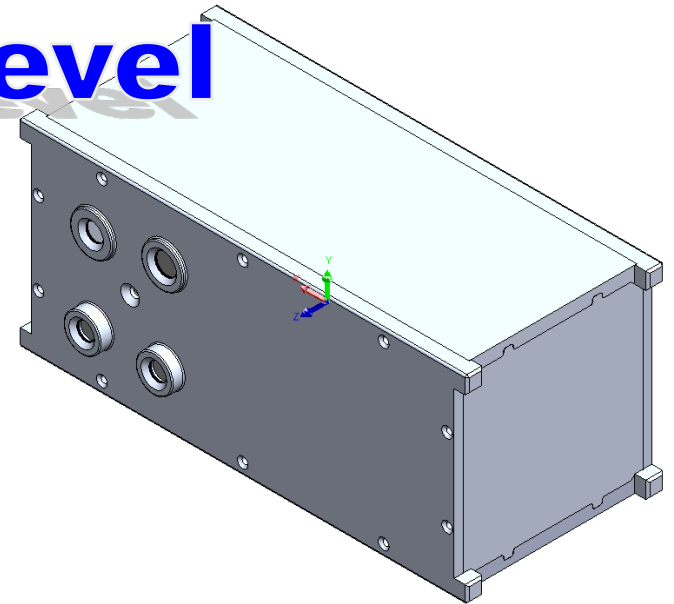
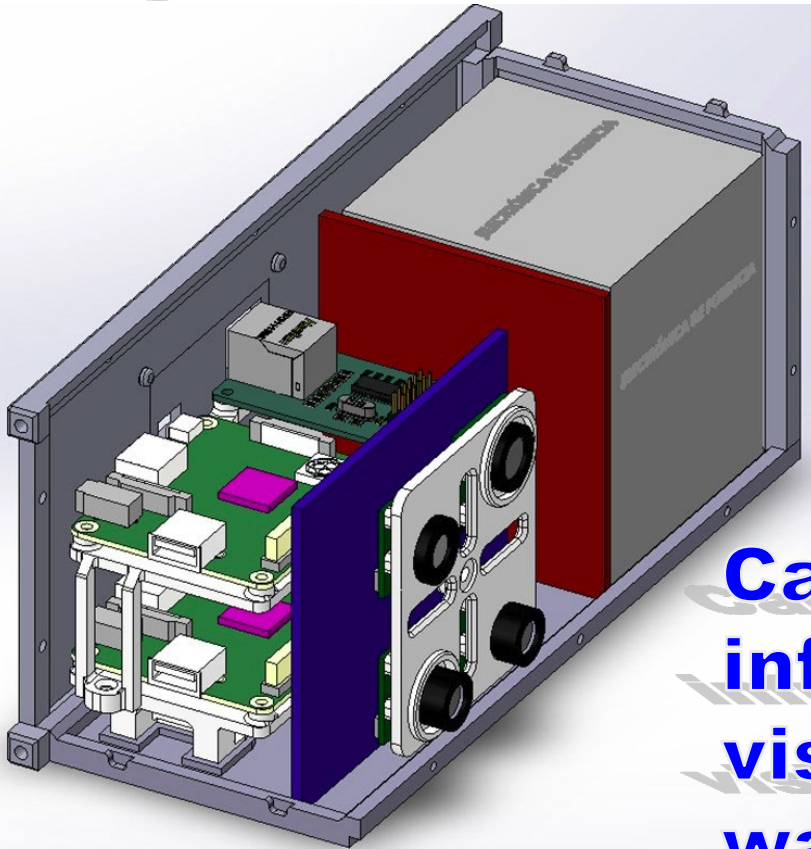


Images taken from the Web

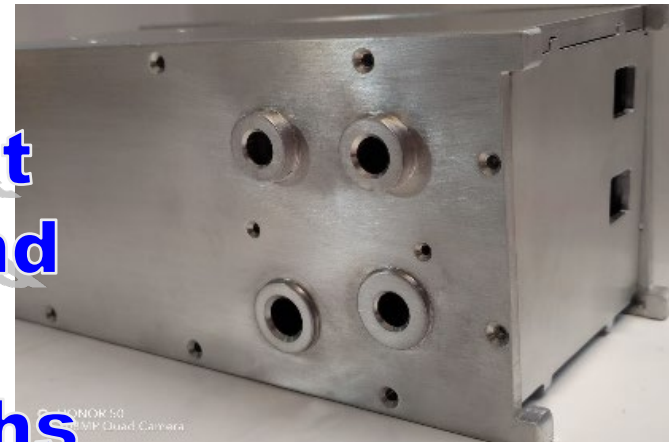
QUALIFICATION MODEL

First level

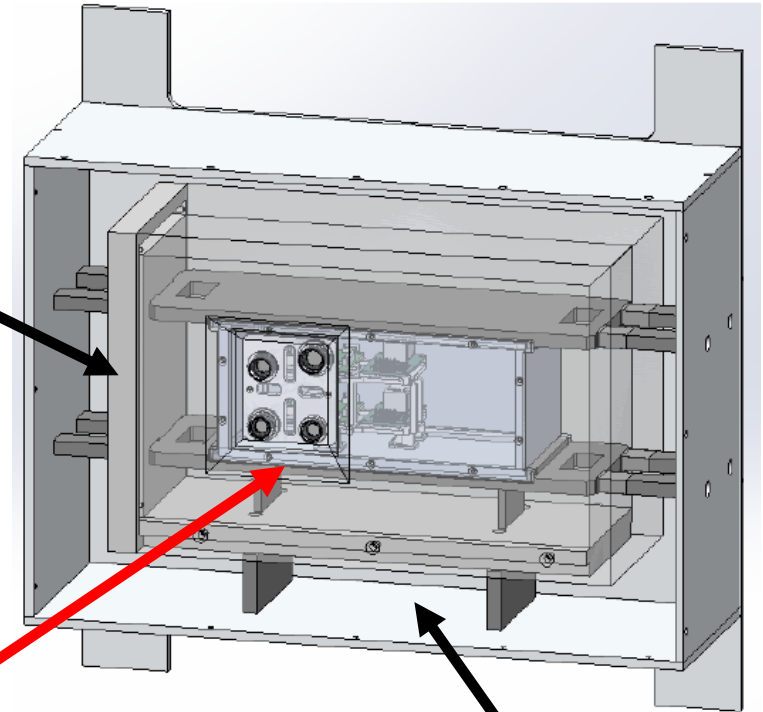
Payload



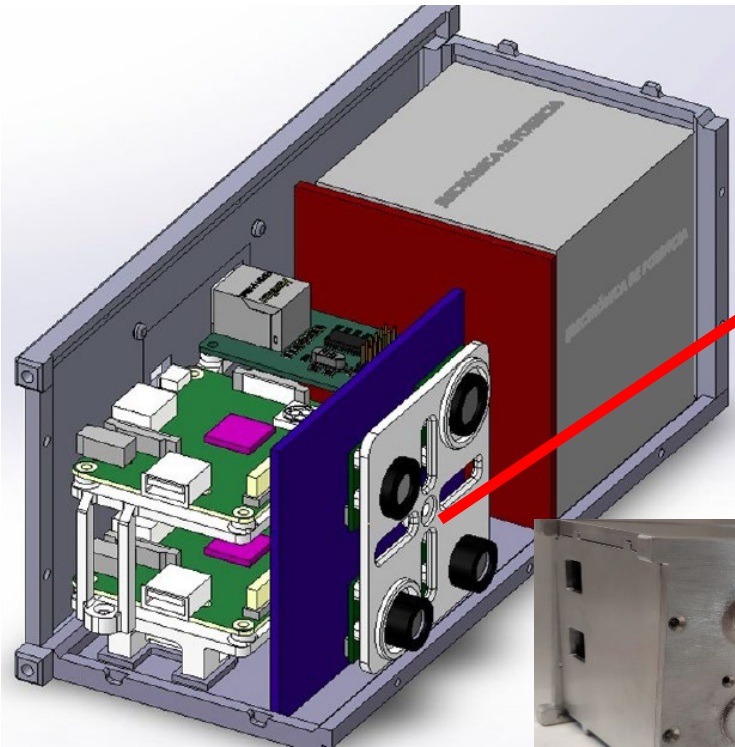
Cameras at
infrared and
visible
wavelengths



Second level



Third level



First level





Infrared Platform for Earth Observation (logo)

China Space Station



It has been a Great Experience!

- 1. Acquiring experience in the development of instruments for operation at space**

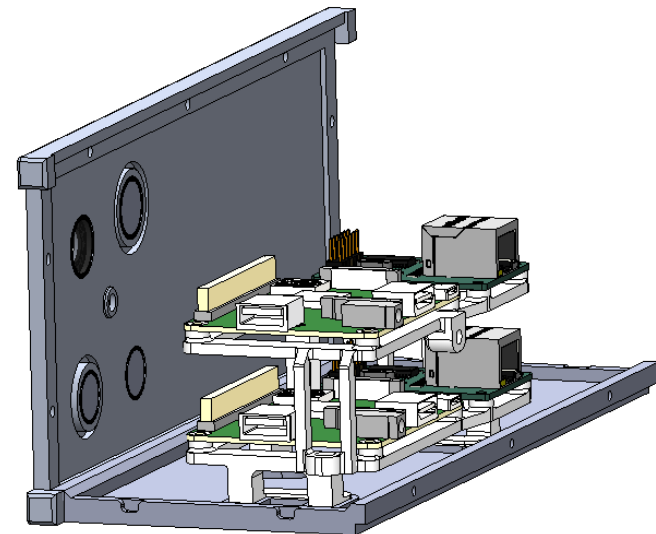
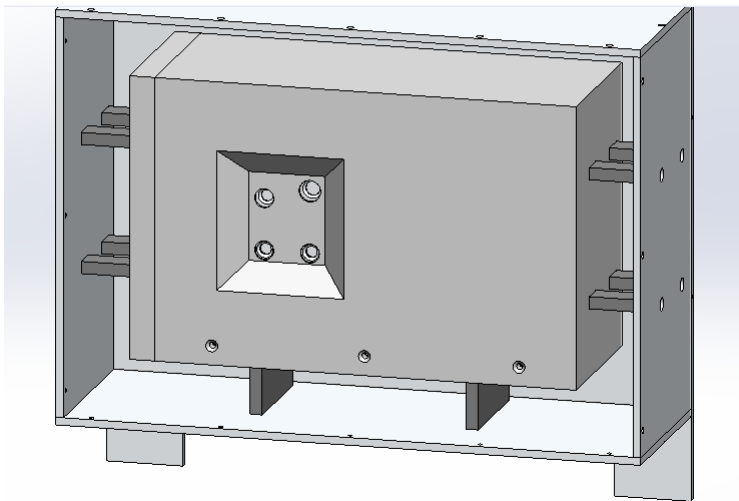
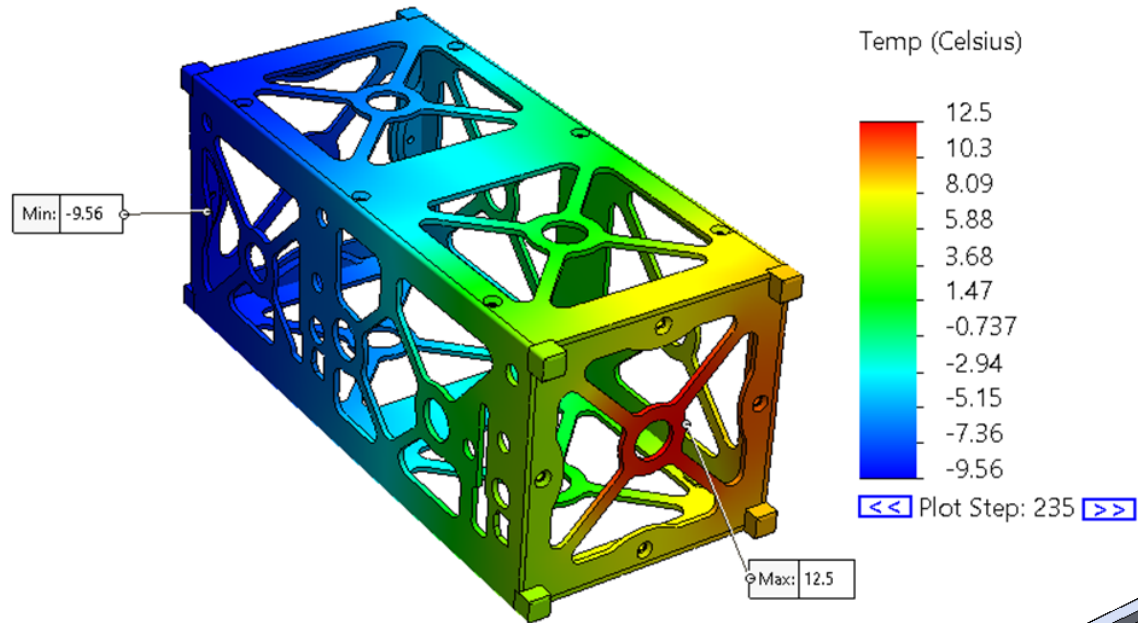


**Portable telescope to use
at high altitude mountains**

**Telescopes and
optical, mechanical
componentes for
use at Cubesats**



Mechanical and thermal simulations

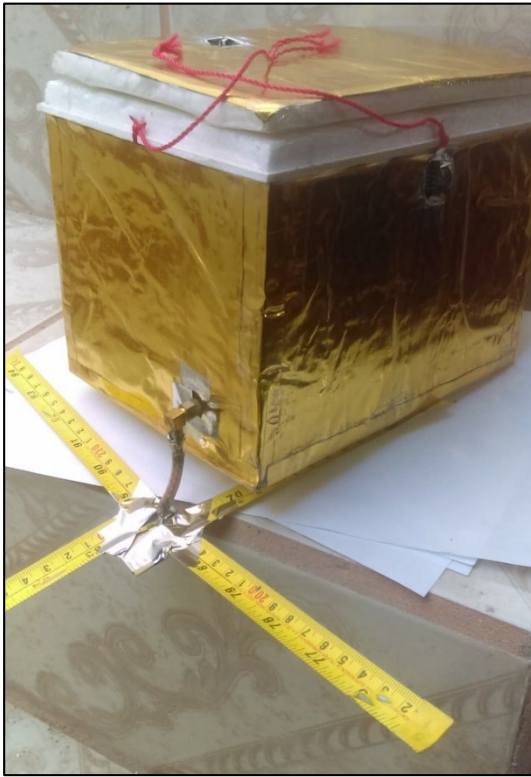


Meteorological Balloons





Radiosonde probes



Weight

- 400-900 g

Frequency Transmitter

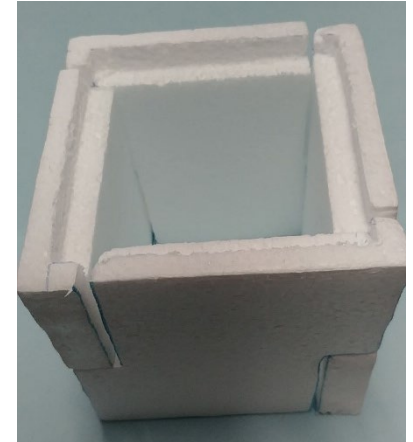
- 433 MHz

Type of antenna

- Turnstile

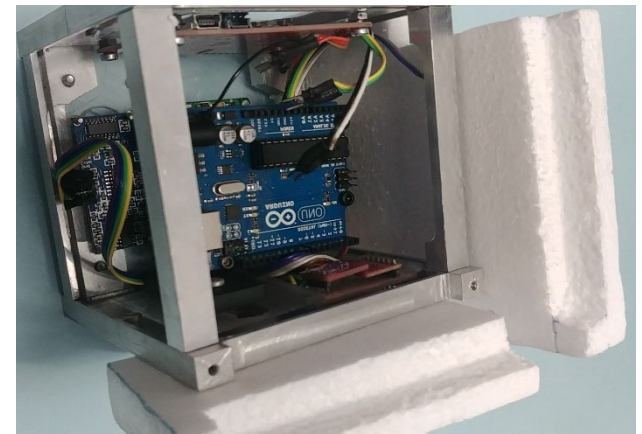
Number of cameras

- 2 - 5



Set of Sensors

- Accelerometer
- Compass
- Barometer
- CO sensor
- GPS
- Humidity
- Temperature
- UV light



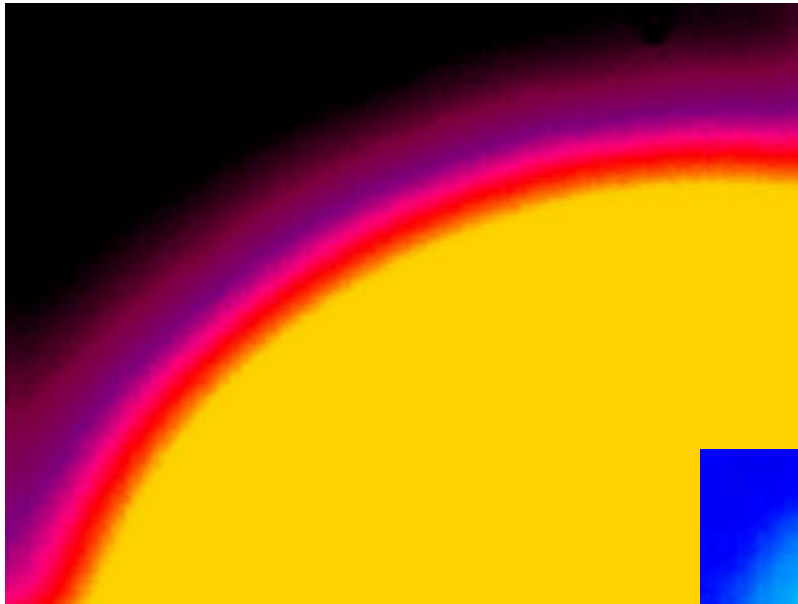
**Altitude
~20 km**



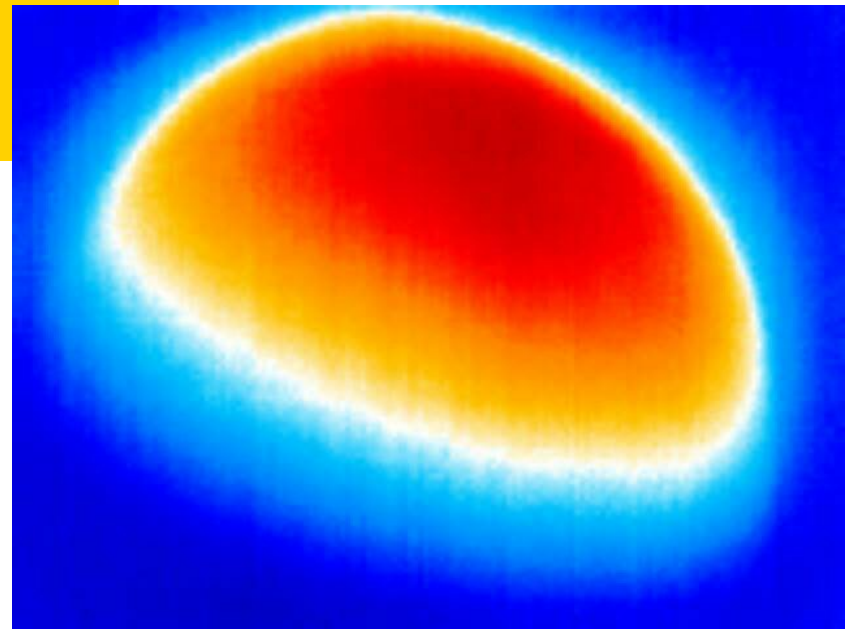
2. OTHER APPLICATIONS

ASTRONOMY

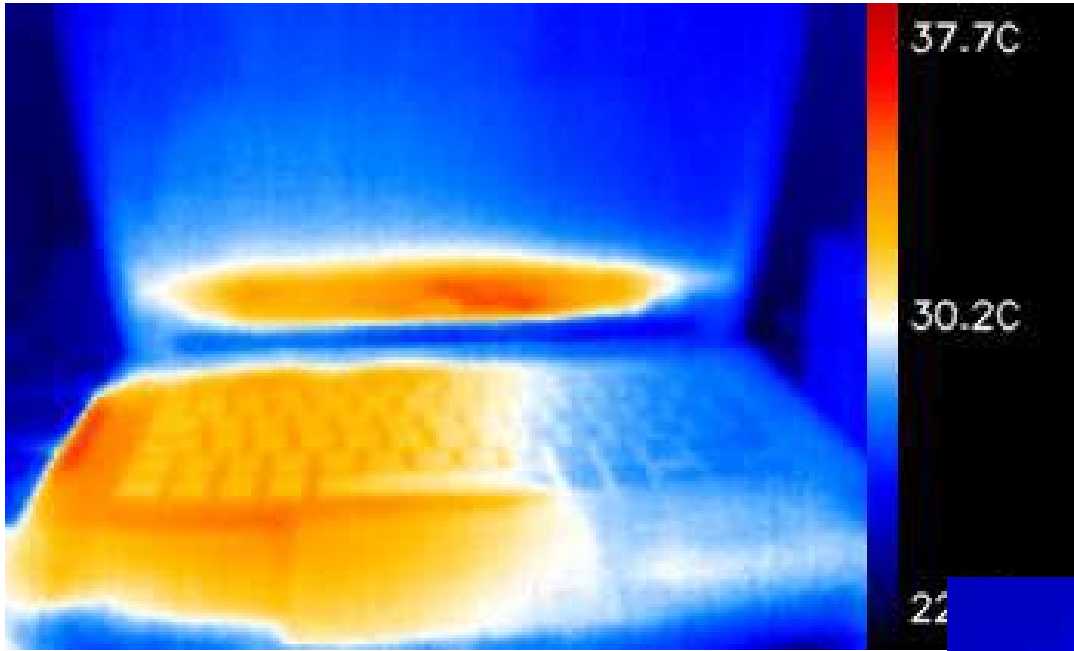
The Sun



Observed with the
miniaturized IR
telescope

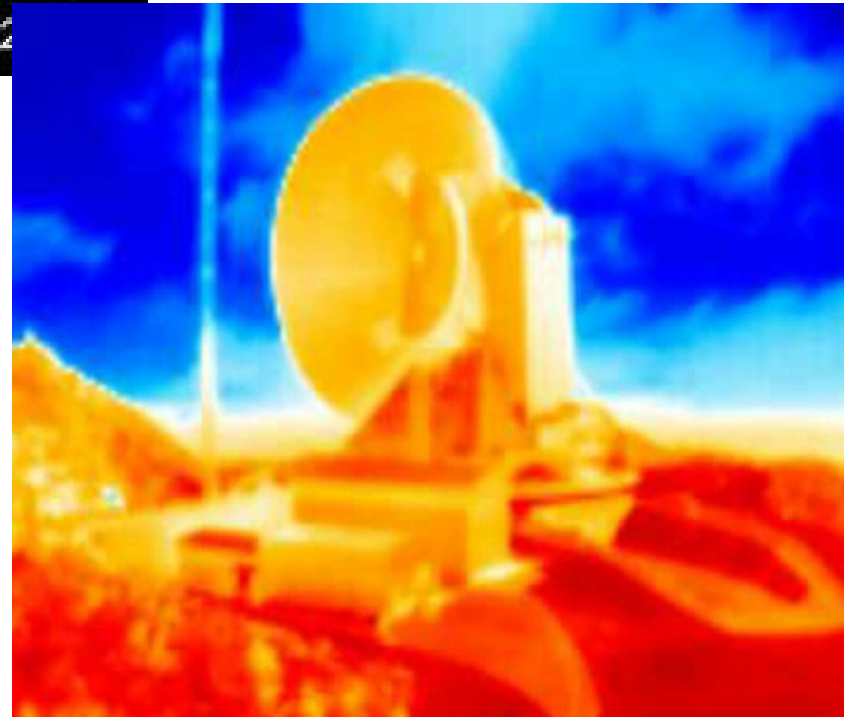


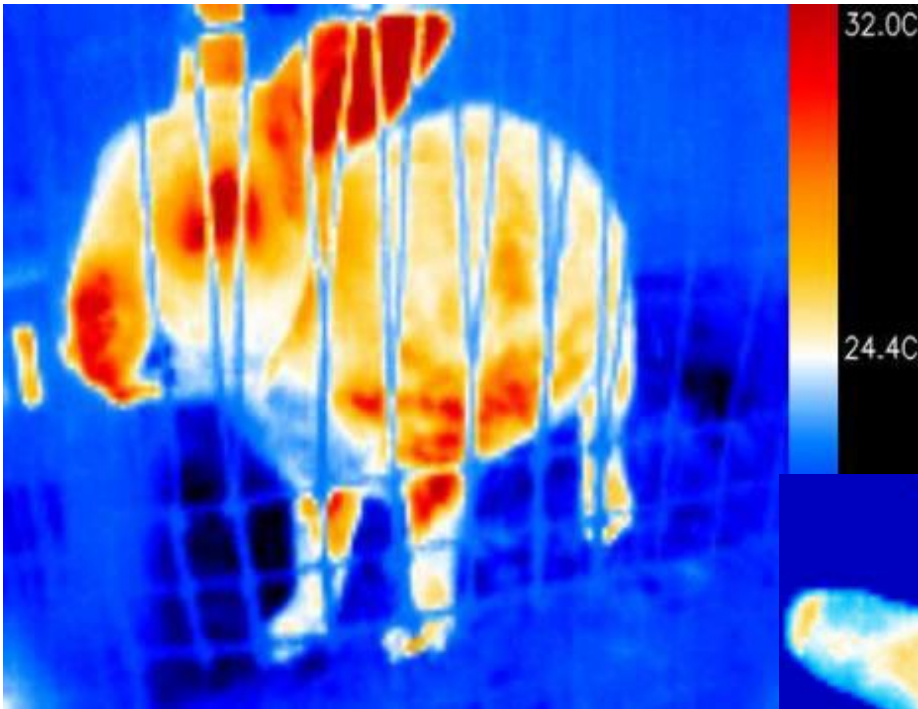
The Moon



For industry

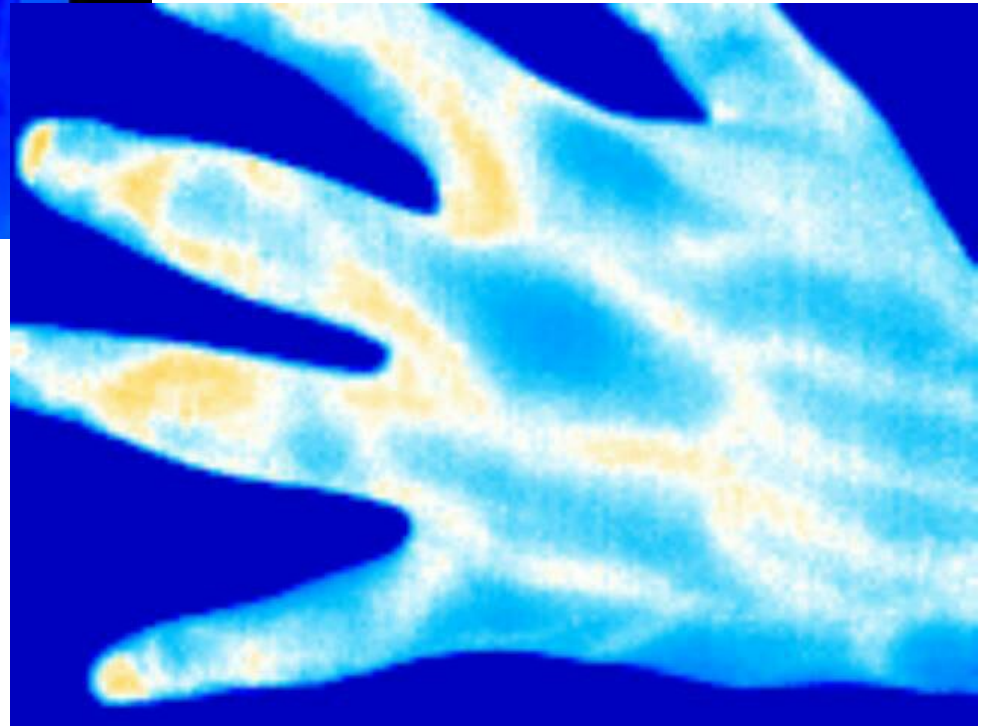
**For monitoring
the antenna
temperature**





**Use in
Veterinary**

**Use in
Medicine**



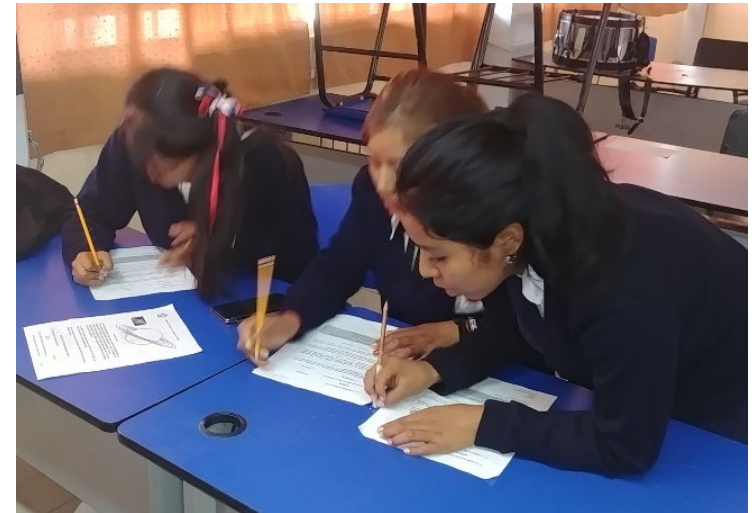
3. Activities for school students

Workshops on Space Sciences and Mathematics at High Schools



A talk on Space Sciences

The aim is to solve interesting exercises for students, using some Mathematic tools that typically are not easily understood for the students



Solving exercises, with the advise of members of our team





Visit to a planetary

Workshops on Astronomy and Mathematics at the institute

Handling of telescopes



Water rockets



Workshop on Astronomy and Mathematics at parks



(Contents of an exercise)



CRATER PLATON



ella no se fragmentan ni se queman antes del i
tiene unas zonas oscuras llamadas mares que e

PREGUNTA

1.- ¿La Luna

A) Natural

2.- ¿Qué ca

A) Las estre

3 ¿Cuál es e

A) 3,500 Kil

4.- En el dit

real de la L



er Platón tiene un diámetro de 3 milímetros. Si el diámetro
er Platón. (respuesta=105 km)

Measurement of the Earth Radius

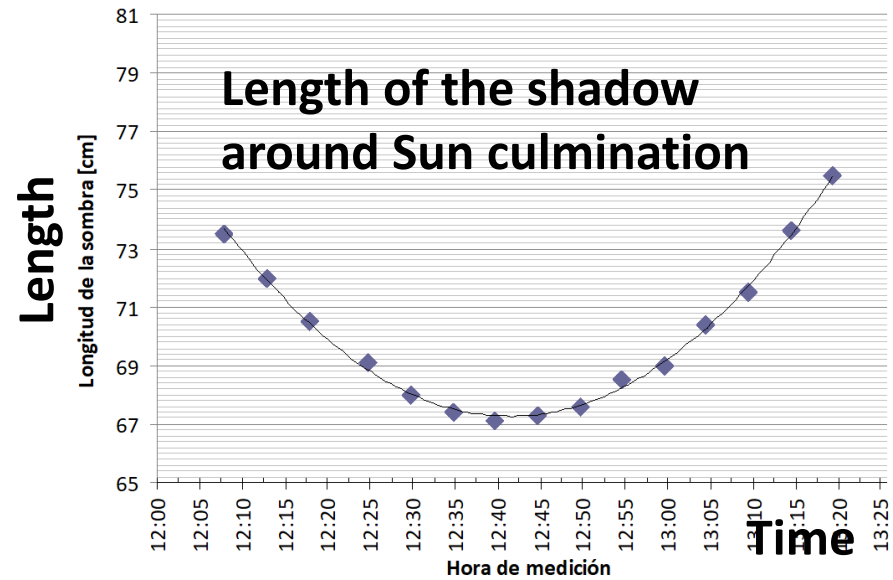
Teams of students at different sites of México
As Eratosthenes made in the Ancient Greece
(measuring pole or mast shadow)

Review of concepts:

Geographical coordinates and for
data handling



Team at Baja California, measuring
the length of the shadow of a mast





Construction of a small radio telescope

Visit to a radio telescope

The aim is that the high-school students could understand the basics concepts of how it works



Post-cards



Stickers



Thanks!

