



fcfm

FACULTAD DE CIENCIAS
FÍSICAS Y MATEMÁTICAS
UNIVERSIDAD DE CHILE



SUCHAI - first satellite built in Chile

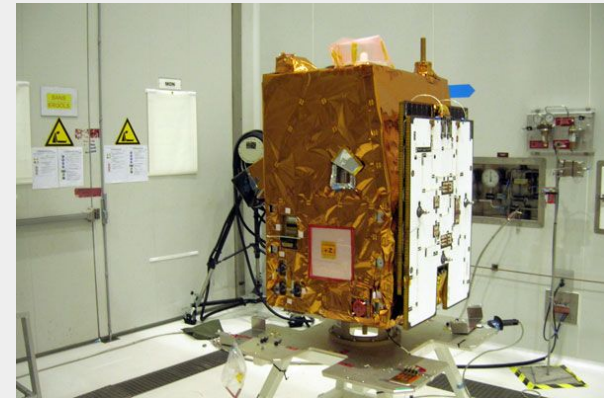
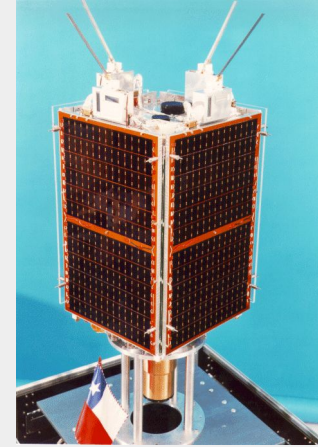
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Chilean satellites

- 2 successes: Fasat-B (Surrey) and Fasat-C (Astrium)
- 1 failure: Fasat-A (Surrey)



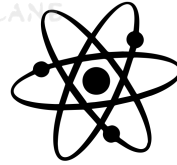
Objectives

Last generation technology for the country



Education

Development of human capital



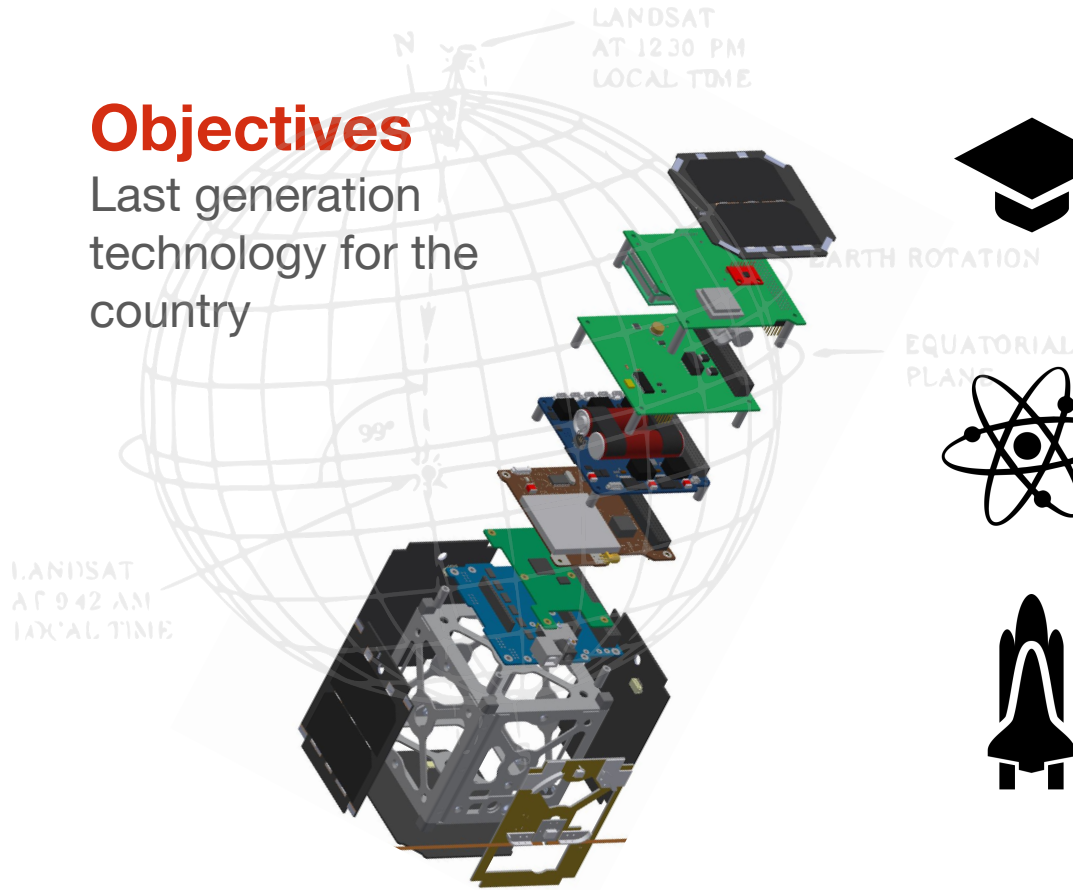
Science

Scientific experiments in space environment



Technology

Integration and development of space technology in Chile



Mission success level

A big challenge with different levels of success



4. Photography

Take a picture of the Earth (and download it)

3. Scientific data

Successful payload operation

2. Telecommands

Reception and execution of remote order (from our GND STN)

1. Listen to the beacon

Correct system operation

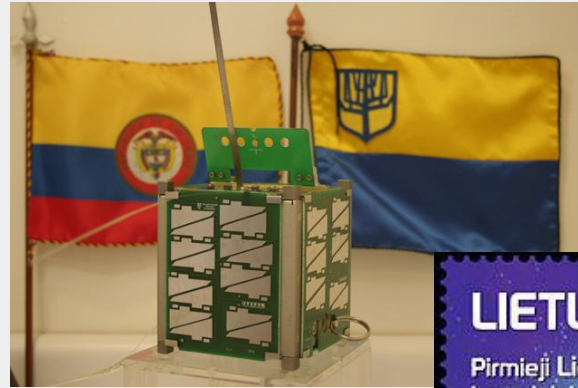
0. Put it into orbit

Successful launch

What's going on the world...

- Cubesat has been the first artificial satellite of many countries
 - Colombia, Switzerland, Hungary, Poland, Romania, Austria, Ecuador, Estonia, Perú, Lithuania, Belgium, Finland, Ghana, Slovakia

(Source: project's web pages - wikipedia)



Timeline

LANDSAT
AT 12:30 PM
LOCAL TIME

EARTH ROTATION

EQUATORIAL
PLANE

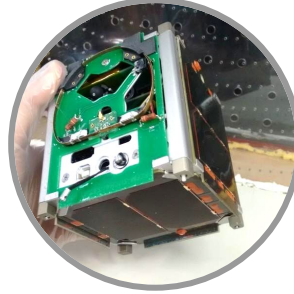
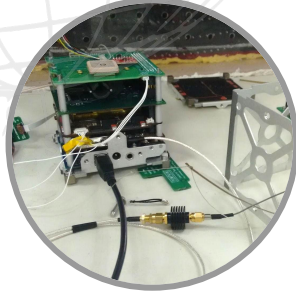
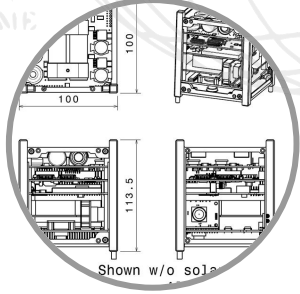
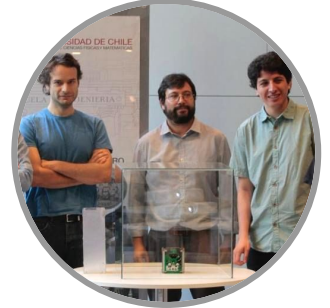
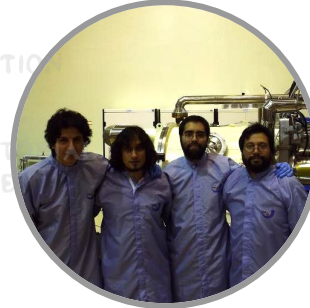
2009

2011

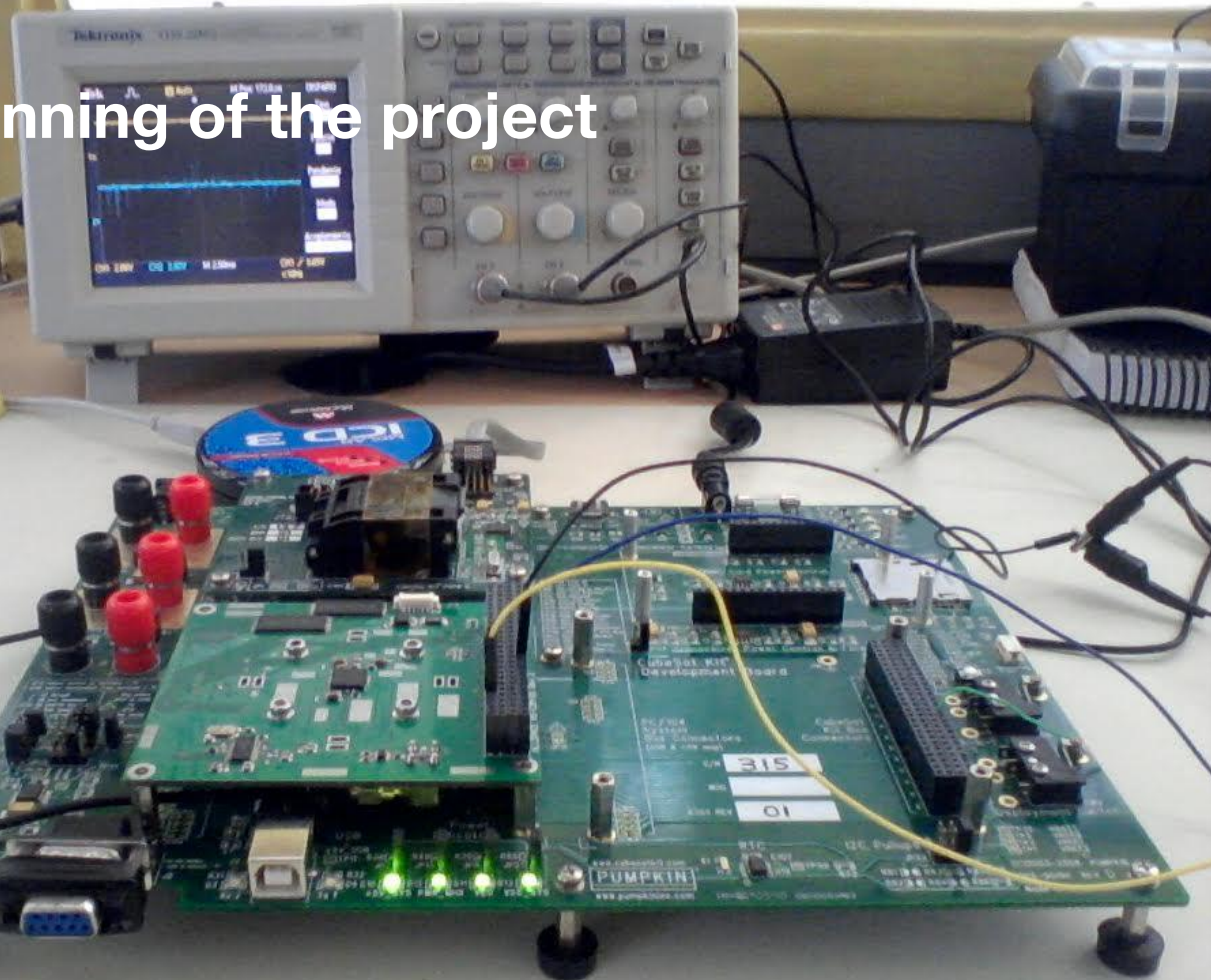
2013

2014

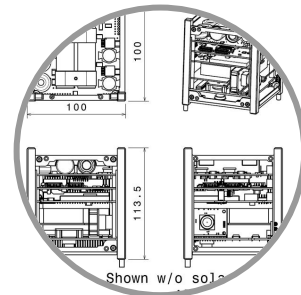
2016



Beginning of the project

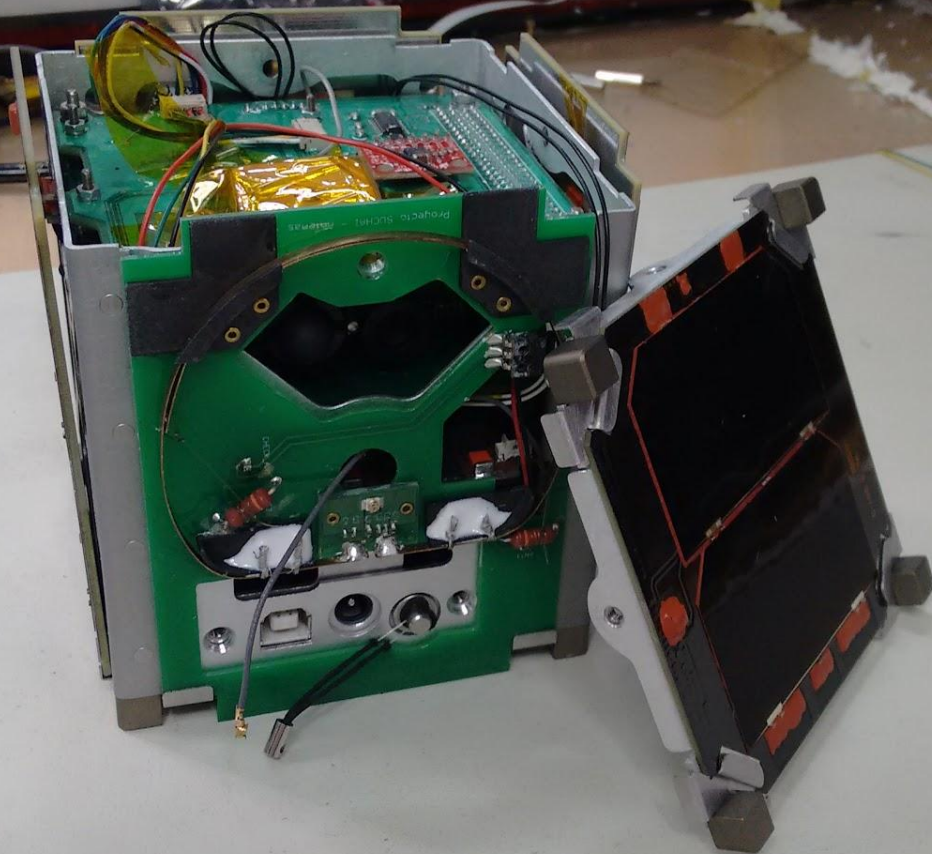
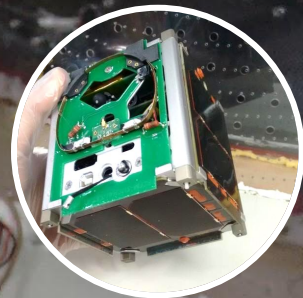


2010



Last 10%...

2014



Final stages



2015



2016



46 LA TERCERA (Santiago) 20 de junio de 2017

Sociedad Tendencias



Primer satélite hecho en Chile será lanzado al espacio desde la India esta semana

Carlos Insuasti

El próximo viernes (20 de junio), Chile podrá hacer historia al lanzar al espacio el primer satélite hecho en Chile, el SatelChil 1, desde la India.

El SatelChil 1 es un satélite de comunicaciones que será lanzado desde el Centro Espacial Satish Dhawan, en la India. El satélite fue desarrollado por la Universidad de Chile, en colaboración con la Universidad de Chile y la Universidad de Chile.

Este viernes, el SatelChil 1 será puesto en órbita desde el Centro Espacial Satish Dhawan.

Se trata de un nanosatélite construido por investigadores de la U. de Chile.

Avisos Clasificados

URGENTE

El día 20 de junio, a las 18:00 horas, se lanzará el satélite SatelChil 1 desde el Centro Espacial Satish Dhawan, en la India. El lanzamiento será transmitido en vivo por el canal de YouTube de la Universidad de Chile.

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TH ROTATION

EQUATORIAL PLANE

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LANDSAT
AT 1230 PM
LOCAL TIME

SUCHAI 10:11:59 UTC

00suchai02111111101 0hz

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SUCHAI Remote Ground Station

Archivo Herramientas Ayuda

Consola Telecomandos Telemetría

	Time	Status	Payload	Frames	Lost frames	Payload status	Data length	Data
402	17-08-09 02:46:52	Finished	Status	2	0	Stop	1	0x0000,0x000...
403	17-08-01 14:20:10	Finished	Status	2	0	Stop	1	0x0000,0x000...
404	17-08-01 14:18:39	Finished	Status	2	0	Stop	1	0x0000,0x000...
405	17-08-01 14:18:13	Finished	Status	2	0	Stop	1	0x0000,0x000...
406	17-08-01 14:15:22	Broken	Gyroscope	28	3	Waiting down...	950	0xB389,0x45C...
407	17-08-01 14:14:46	Finished	Status	2	0	Stop	1	0x0000,0x000...
408	17-07-12 19:29:40	Broken	Status	99	3	Waiting down...	9880	0xB0C5,0x45C...
409	17-07-12 19:29:39	Finished	Status	2	0	Stop	1	0x0000,0x000...
410	17-07-12 19:29:39	Finished	Gyroscope	32	0	Waiting down...	950	0xB0CF,0x45C...

Fields	0	1	2	3
Time1	2017-07-03 11:03:05	2017-07-03 11:04:05	2017-07-03 11:05:05	2017-07-03 11:06:05
sta_RTC_isAlive	0x0001	0x0001	0x0001	0x0001
sta_TRX_isAlive	0x0000	0x0000	0x0000	0x0000
sta_EPS_isAlive	0x0000	0x0000	0x0000	0x0000
sta_MemEEPROM_isAlive	0x0001	0x0001	0x0001	0x0001
sta_MemSD_isAlive	0x0001	0x0001	0x0001	0x0001
sta_AntSwitch_isOpen	0x0001	0x0001	0x0001	0x0001
sta_fpl_index	0x0000	0x0000	0x0000	0x0000
sta_ppc_opMode	0x0000	0x0000	0x0000	0x0000
sta_ppc_lastResetSource	0x0006	0x0006	0x0006	0x0006
sta_ppc_hoursAlive	0x00F8	0x00F8	0x00F8	0x00F8
sta_ppc_hoursWithoutReset	0x0084	0x0084	0x0084	0x0084
sta_ppc_resetCounter	0x0010	0x0010	0x0010	0x0010
sta_ppc_wdt	0x0001	0x0001	0x0001	0x0001
sta_ppc_osc	0x0004	0x0004	0x0004	0x0004
sta_ppc_MB_nOE_USB_nINT_stat	0x0000	0x0000	0x0000	0x0000
sta_ppc_MB_nOE_MHX_stat	0x0001	0x0001	0x0001	0x0001
sta_ppc_MB_nON_MHX_stat	0x0000	0x0000	0x0000	0x0000

DB Server: 192.168.11.154 Port: 27017 Reconnect Import CSV Delete

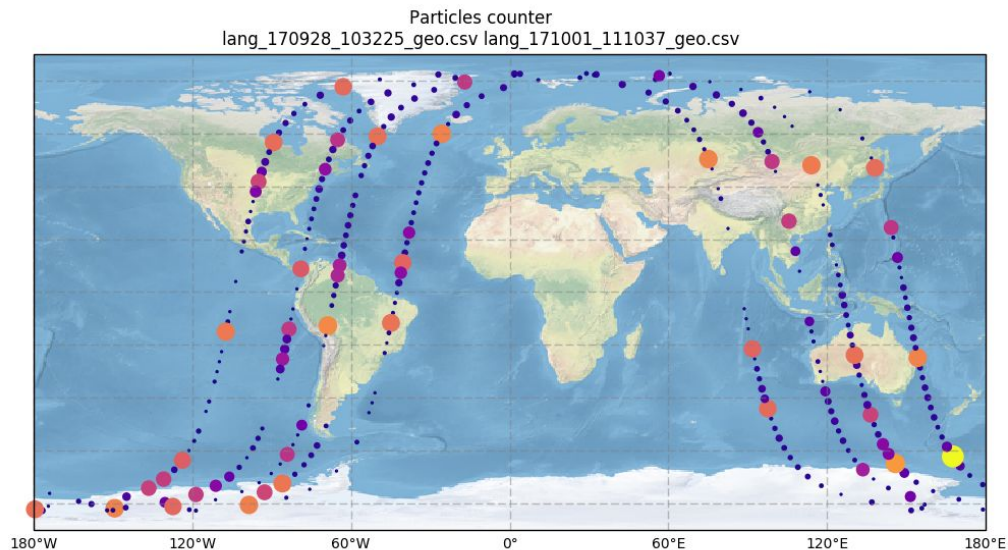
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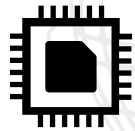
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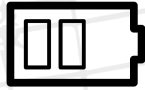
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SUCHAI 2 & 3

New generation of satellites
for scientific purposes
(2 x 3U Cubesats)



x2



x3



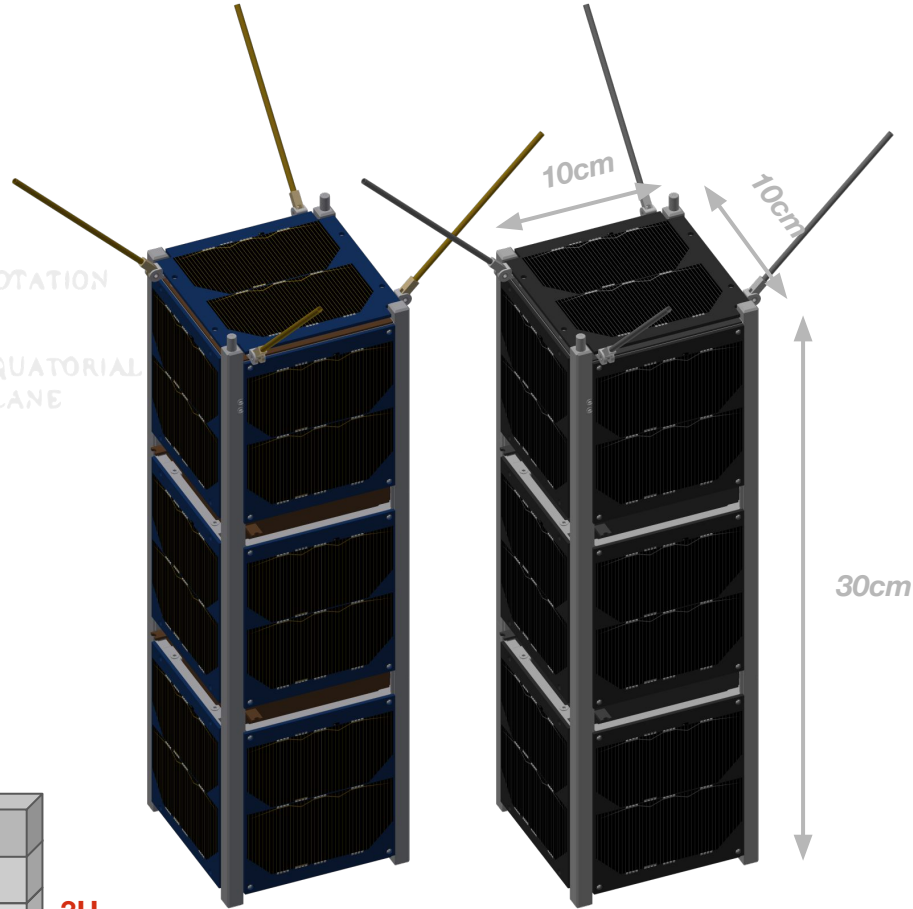
x3



1U



3U



Payloads

- **Space physics**

- Langmuir Probe
- Magnetometers
- Double band GPS
- Femto satellite networks
- Microgravity experiments

- **Technology**

- Flight software
- Failure forecast and detection
- Passive thermal systems
- Constellations
- 60 GHz communication (ISL)
- Positioning and star trackers
- Propulsion
- Deorbiting system

Technology

Space physics

Payloads

Base system

What we learnt (not so technical)

- Cubesat democratized the access to space and we benefited from that
- Cooperation is key to success.
- To fail is part of the process and we need to learn to fail.
- There's no better way to train engineers than a hands on project
- A Cubesat is small, resource-limited platform but after all, is a KICK OFF for something bigger if there's a good continuation plan.
- We are conscious that space is a global resource therefore we have to be careful about using it.

SPEL

Space and Planetary
Exploration Laboratory





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