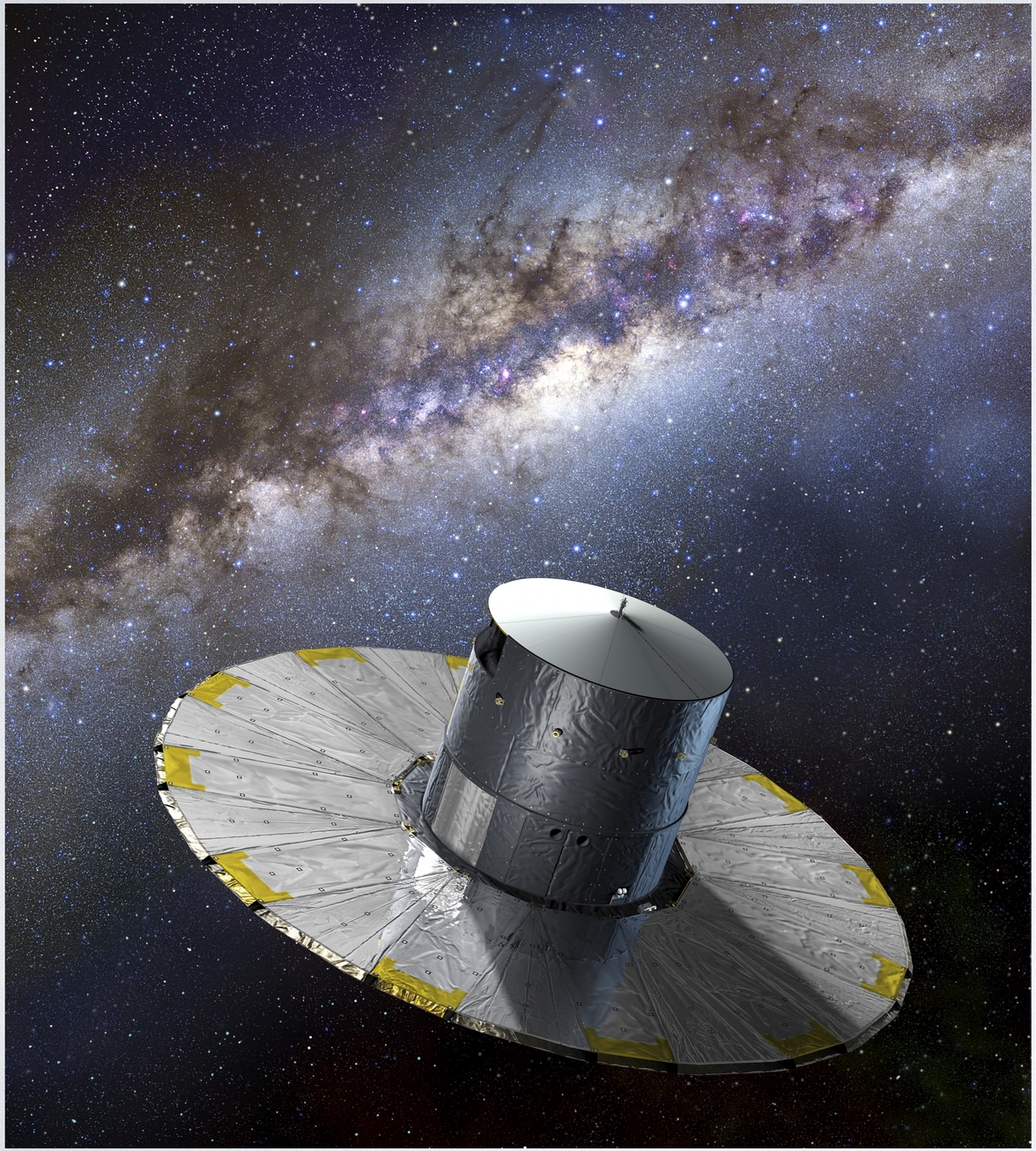
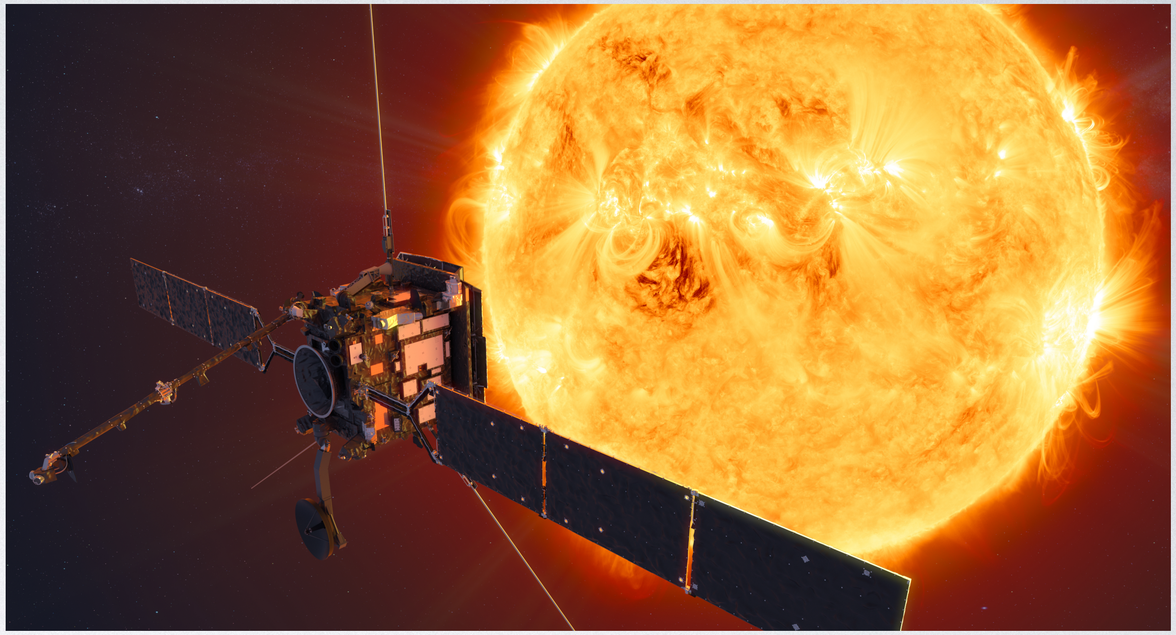
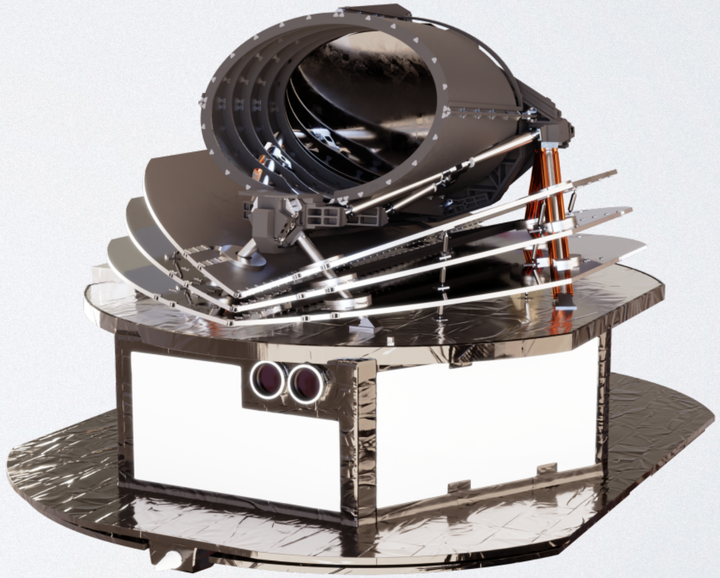
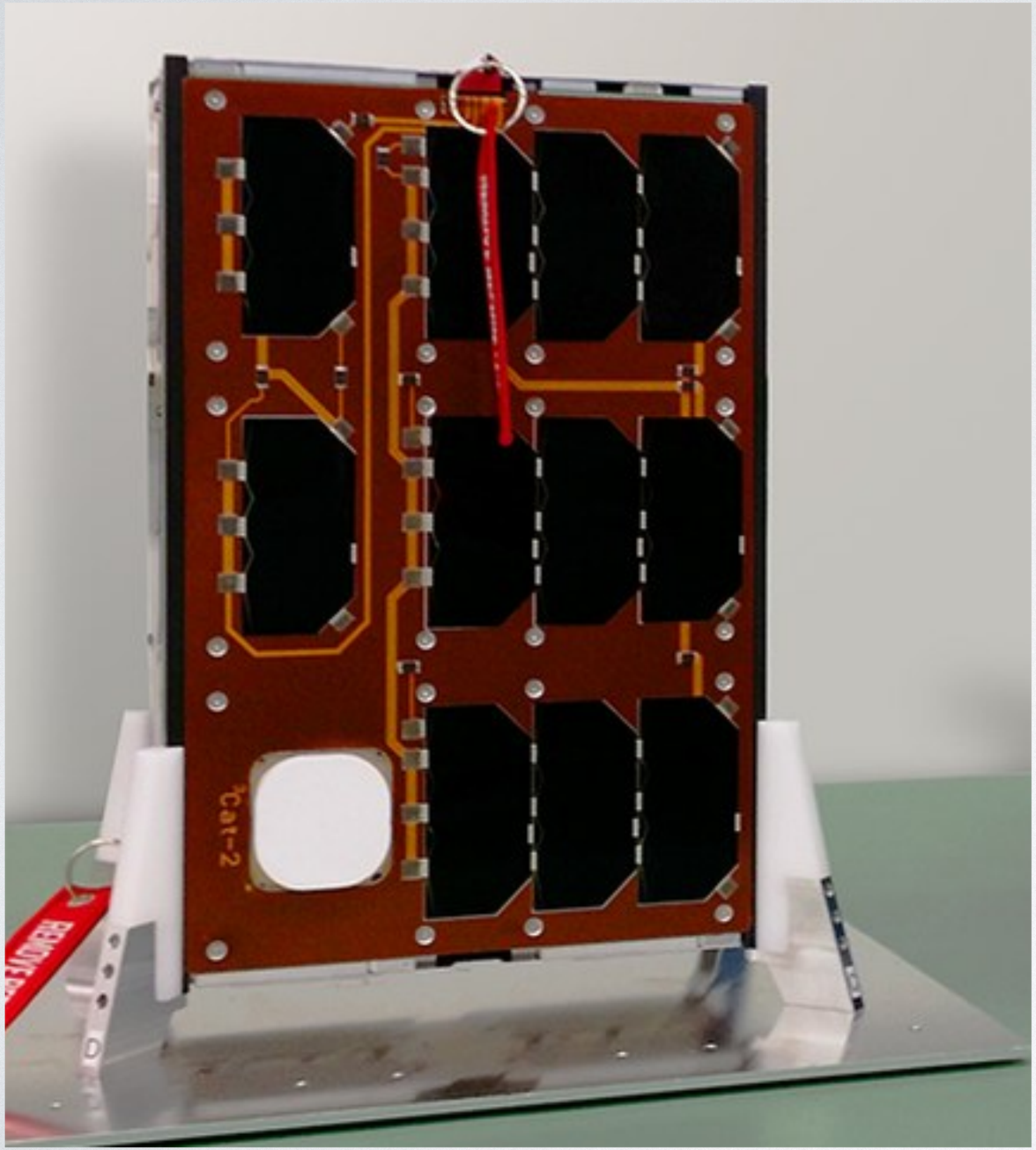
SMALLSATS

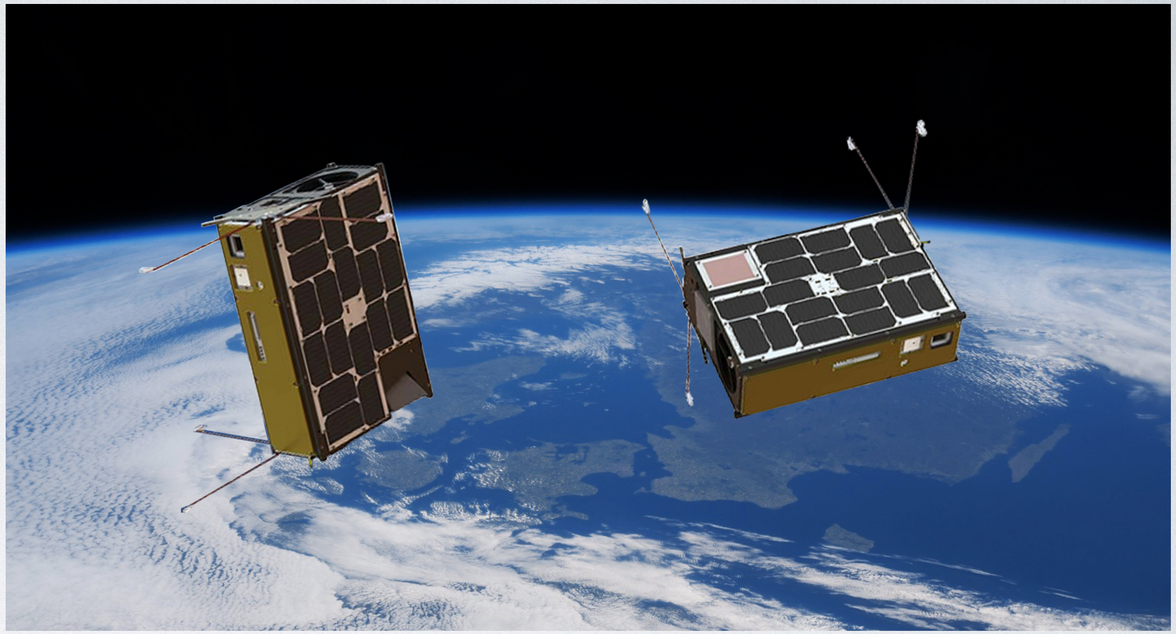
A new opportunity for research





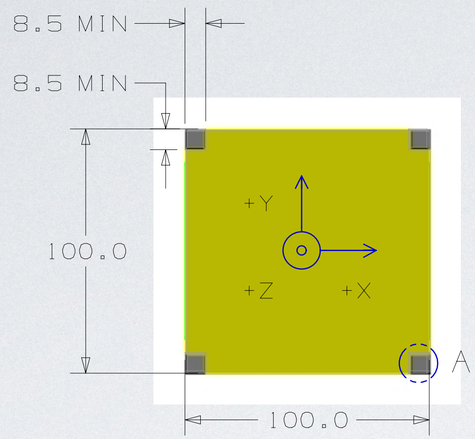


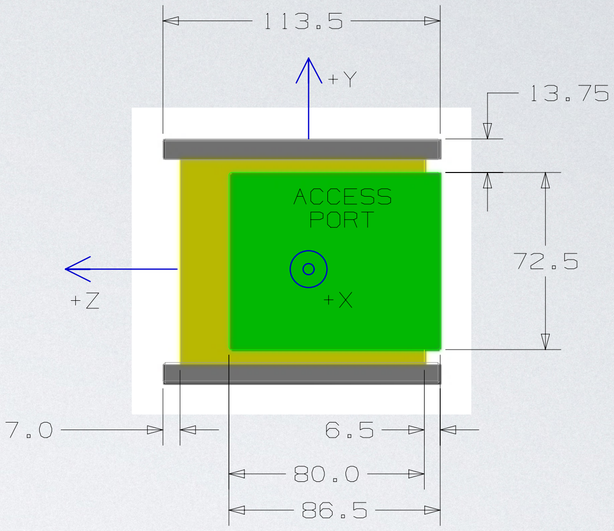

REMOVE
Cat-2

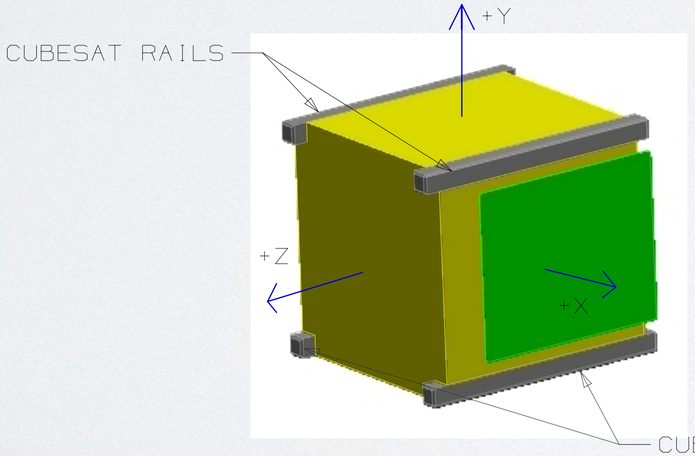


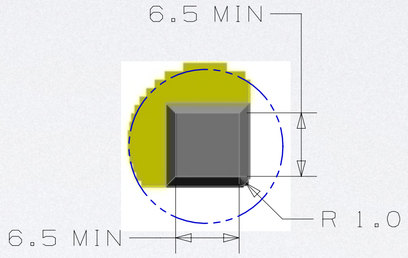
CUBESATS

- In 1999 a reference design is proposed: Cubesat
  - Jordi Puig Suari: California Polytechnic State University
  - Bob Twiggs: Stanford University
- Make Sputniks with present technology









DETAIL A

STANDOFF CONTACT DETAIL FOR +Z

ADDITIONAL NOTES:

-CubeSat coordinate system located in the geometric center of the CubeSat.

-No external components other than the rails shall touch the inside of the P-POD.

-All 1U CubeSats must have two (2) separation springs and at least one (1) deployment switch on the -Z face. See drawing CDS-13-006, Deployment Switch and Separation Spring Location, for more details.

CUBESAT

California Polytechnic State University
CubeSat Program
(805) 756-5087
San Luis Obispo, CA 93407

ALL DIMENSIONS IN MILLIMETERS	DESIGNED BY	S.FUR	PART NAME: 1U CUBESAT	REV: 13
TOLERANCE .X ± 0.1	DRAWN BY	S.FUR		
	CHECKED BY	J.CAR		
ROUND ALL EDGES AND CORNERS	APPROVED BY	R.NUG	SIZE: B	ASSEMBLY: CUBESAT SPECIFICATION
	DRAWING #	CDS-13-001	NOT TO SCALE	DATE: 02/20/14 — SHEET 1 OF 1

CUBESATS

Rev	Description	Date	Initials
A	First release	22 Sep 2014	GLEB
B	Updated wording for 6U XL	23 Sep 2014	GLEB
C	Added 12U XL information	01 Sep 2016	GLEB

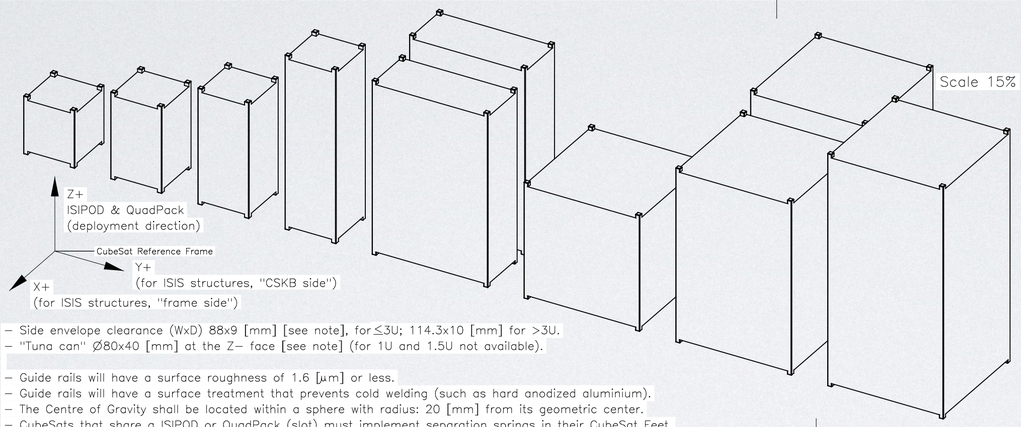
ISIS Advised CubeSat Basic Dimensions
Applicable for ISIS satellite dispenser systems
(Both ISIPOD and QuadPack)

Inline with CubeSat Design Specification, CDS_Rev13

Note: between the ISIS satellite dispenser systems ISIPOD and QuadPack there are small differences in maximum allowable volume, namely:

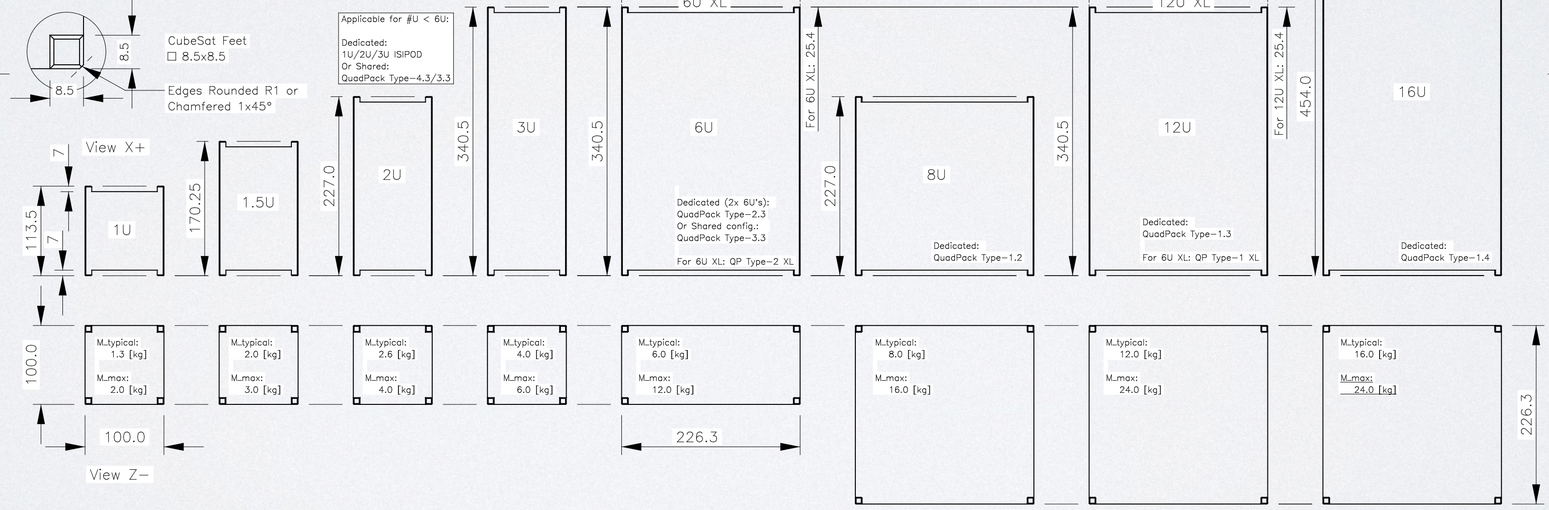
ISIPOD allows for additional space on top,
QuadPack allows for more volume at all lateral sides,
Both systems can handle an even larger "tuna can" on the bottom.

These mentioned additional volume allocations can only be used after consultation with and written approval from ISIS.



- Side envelope clearance (WxD) 88x9 [mm] [see note], for ≤3U; 114.3x10 [mm] for >3U.
- "Tuna can" Ø80x40 [mm] at the Z- face [see note] (for 1U and 1.5U not available).

- Guide rails will have a surface roughness of 1.6 [µm] or less.
- Guide rails will have a surface treatment that prevents cold welding (such as hard anodized aluminium).
- The Centre of Gravity shall be located within a sphere with radius: 20 [mm] from its geometric center.
- CubeSats that share a ISIPOD or QuadPack (slot) must implement separation springs in their CubeSat Feet.
- Each CubeSat must incorporate a minimum of one deployment confirmation switch, located at the CubeSat Feet.
- The CubeSat must be inoperative/inactive during launch.

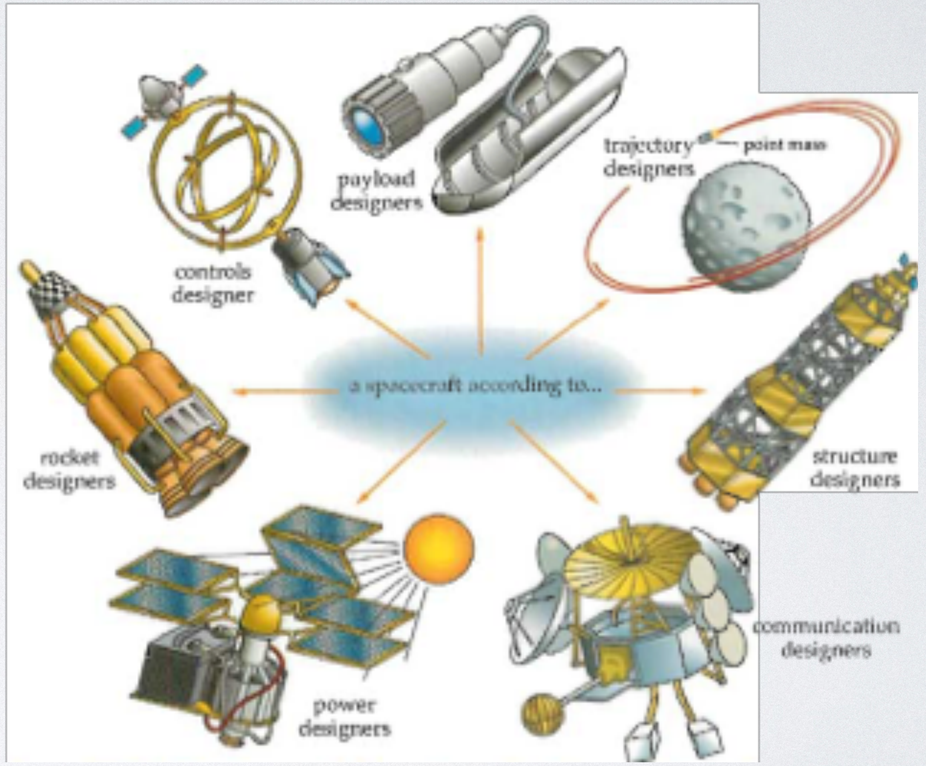


Project name	ISIS Advised Envelopes	Scale	20%		By	Date	Material	n.a.
Drawing name	The CubeSat Family	Size	A3	Drawn	GLEB	01 Sep 2016	Surface treatment	n.a.
Drawing number	ISIS.STS.0.0.001	Rev	C	Checked	RSLO	01 Sep 2016	Dimensions	[mm]
		Sheets	1/1	Approved	CBER	01 Sep 2016	Tolerance	±0.1

Notes:
Use "Ctrl"+"5" to select line view

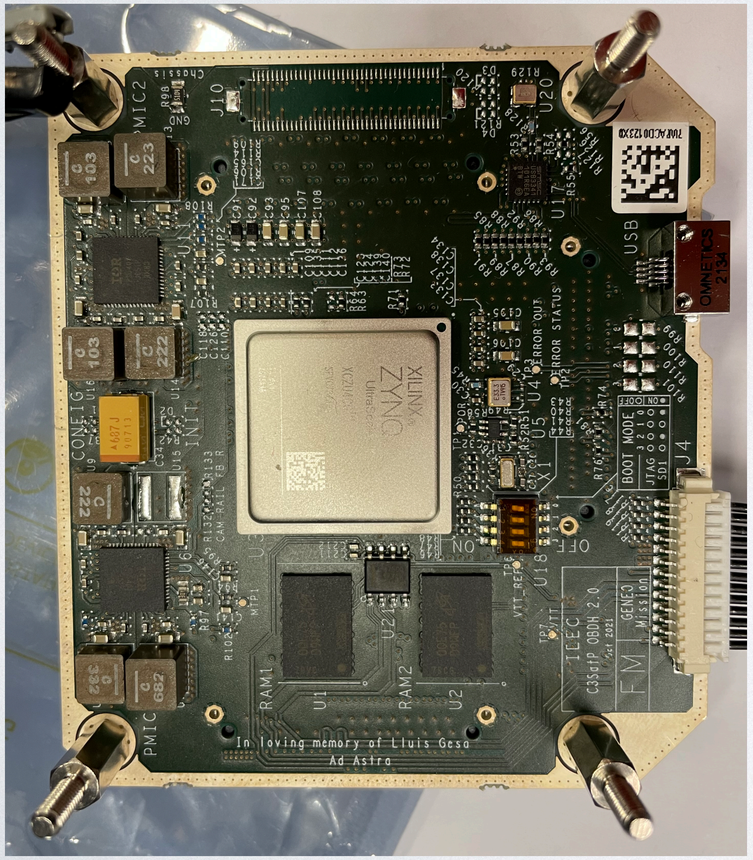
CUBESATS

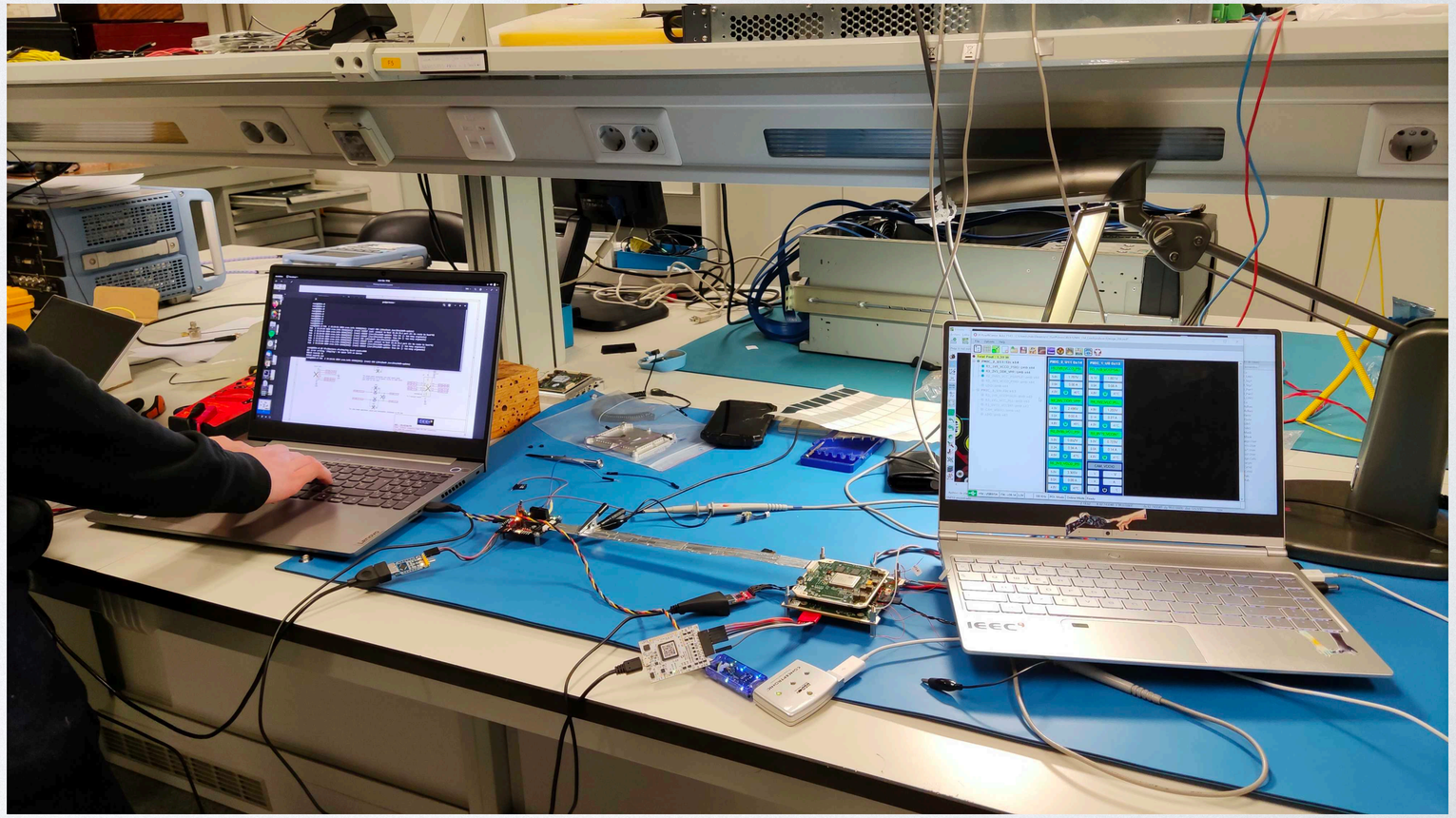
- They are still satellites:
  - Payload
  - Trajectory
  - Structure
  - Power
  - Communication
  - Attitude and Orbit Control



PRESENT MISSIONS

- Secondary payload for the next Catalan Government Cubesat





FUTURE MISSIONS

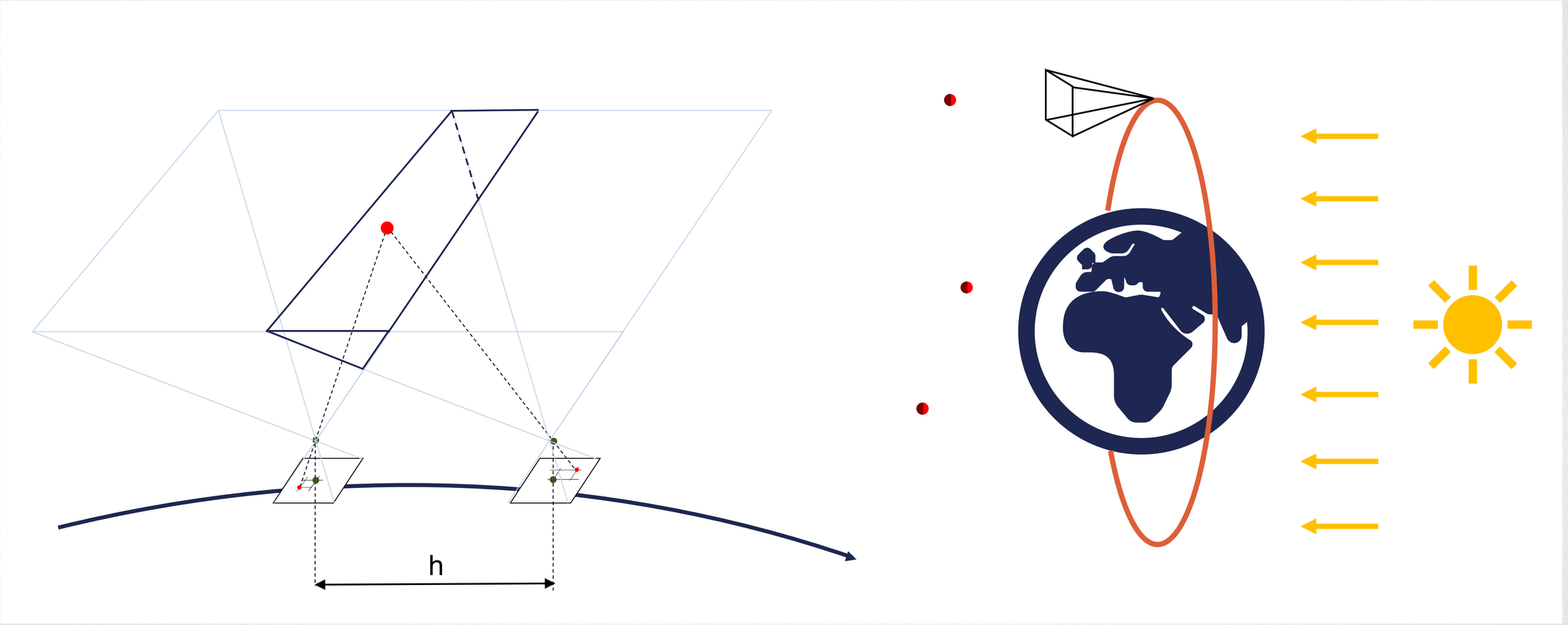
- Change of paradigm
  - Be imaginative, be opportunistic
    - Search for simple ways to do things
    - Minimise / Avoid the need to use mechanisms (launch can be hard)
    - Use software or electronics whenever possible (more reliable)
    - Take profit of latest instrumentation technologies

FUTURE MISSIONS

- Change of paradigm
  - Keep it simple
    - Things are more predictable
    - Risks are easier to manage
  - **They did not know it was impossible, so they did it**

PROPOSED MISSIONS

- 4DCube: Dawn Dusk Debris Detection Cubesat

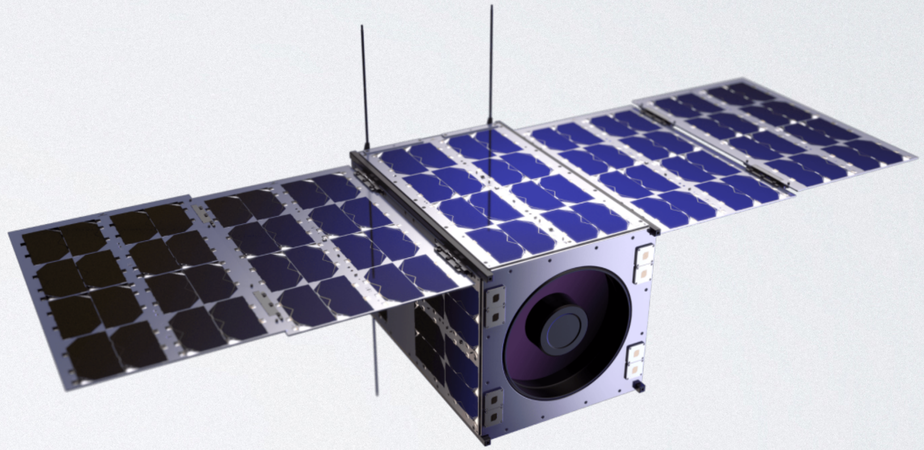


PROPOSED MISSIONS

- 3Cat-Gea
  - Payload for next generation EO satellites
  - Earth Observation
    - Camera
    - RF payload
      - Use GNSS signals

PROPOSED MISSIONS

- PhotSat
  - First IEEC Astronomical mission
  - Scan the sky to make a photometric catalogue
    - Proposed to work with a multispectral camera
      - Visible
      - NIR
      - NUV (There is little data on this side of the spectrum)



CONCLUSIONS

- SmallSats are a new opportunity for science missions
- Reduced cost allows for disruptive approaches
- Complementary with big missions
- NewSpace Strategy is creating an ecosystem that can be helpful