

## Turkish UNISEC (UZTED) Activities



Prof.Dr. Alim Rustem Aslan, UZTED Coordinator, UNISEC Global PoC and StC  
Manager, Space Systems Design and Test Laboratory

Istanbul Technical University, Faculty of Aeronautics and Astronautics,  
Istanbul, Turkey

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Established as a legal society  
23 Members from  
13 Universities (7 Public + 6 Private)  
G. Assembly 19.09.2021

- UZTED Establishment and Meetings
- Model Satellite training for regional students
- Anatolian Rover Challenge, 22-25 July 2022
- Morocco Model Satellite training, 18-22 July
- NASA SPACE EXHIBITION Dec 2021-March 2022
- SHARJAHSAT1 Project and more CubeSat Projects
- Nlotusat Project
- PAUSAT1 Project
- 11th NSAT and 8th UNISEC GLOBAL MEETING 2022
  - UZTED papers



HYBRID EVENT  
ICESCO'S FIRST INTERNATIONAL  
MODEL SATELLITE (CANSAT)  
TRAINING WORKSHOP &  
AEROSPACE SYMPOSIUM  
ICESCO HQ - RABAT - KINGDOM OF MOROCCO



REGISTRATION LINK



JULY 18-22 , 2022

10:00 AM GMT+1

[WWW.ICESCO-ACCELERATOR.COM/CANSAT](http://WWW.ICESCO-ACCELERATOR.COM/CANSAT)





المنظمة العالمية للتربية والعلم والثقافة  
ISLAMIC WORLD EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION  
ORGANISATION DU MONDE ISLAMIQUE POUR L'ÉDUCATION, LES SCIENCES ET LA CULTURE

FIRST INTERNATIONAL

# ICESCO MODEL SATELLITE (CANSAT). WORKSHOP & AEROSPACE SYMPOSIUM

” BUILDING TOMORROW'S  
GLOBAL WORKFORCE ”

July 18-22, 2022

10:00am to 5:00pm GMT



Website



Registration

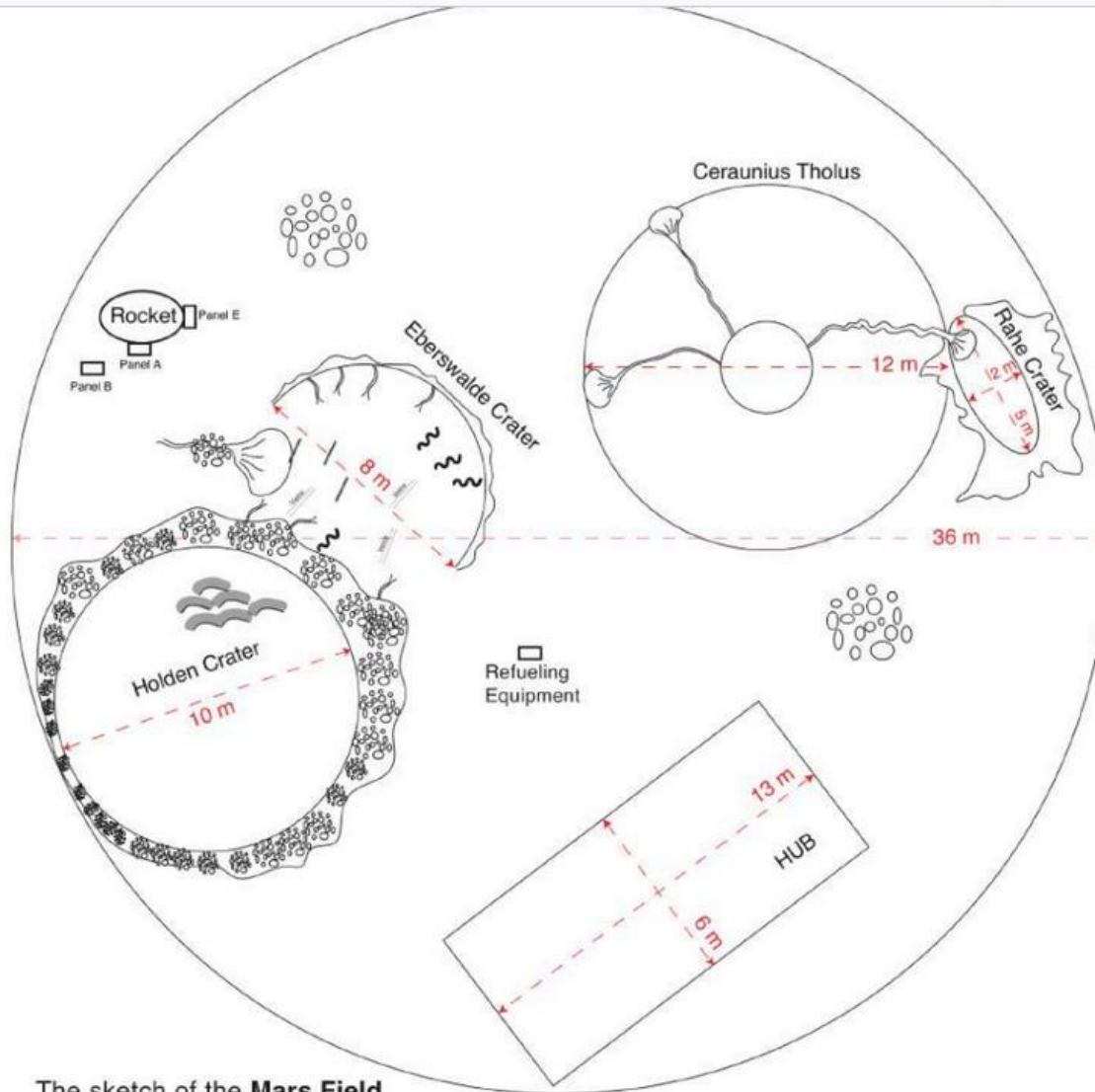

















- **Anatolian Rover Challenge** is an annual international “**rover**” challenge. In the scope of the challenge, the teams of students that are affiliated by academic institutions try to achieve the determined missions by their own designed "planetary exploration robots" called **rovers**.
- The student teams to apply for the challenge go through a design report process.
- After the evaluation of all reports, teams that qualify for the finals are determined, and announced to participate in the finals.
- The finals are held in the carefully designed challenge area. The challenge area consists of an open field with a diameter of approximately 40 meters.
- The area is designed to resemble the surface of a planet or a celestial body to be explored.



The sketch of the **Mars Field**

The Mars field in ARC'22 is filled with features that requires scientific exploration by your rover. Find a solid hypothesis and form your experiments around. We kindly remind you that

# Results Of The Competition

Team	Mission 1 Score	Mission 2 Score	Mission 3 Score	Mission 4 Score	Total Score
 Project Scorpio	70	33	49	83	235
 Project Kratos	66	0	69	98	233
 MIST Mongol Barota	84	4	62	67	217
 RoverOva	50	33	35	77	195
 Yildiz Rover	13	7	39	48	107
 Team Anveshak	0	6	13	43	62
 GTU Rover	3	0	26	30	59
 Ska Robotics	10	0	5	40	55
 Kapsul Rover	3	0	0	39	42





# THE WORLD'S BIGGEST TOURING SPACE EXHIBITION

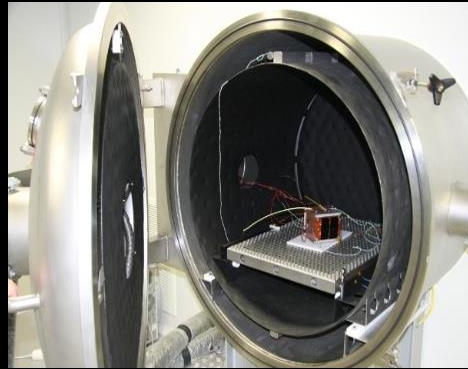
Nasa Space Adventure Exhibition is in Metropol Istanbul with its interactive experience zones, until end of February!



# İTÜ-SSDTL Space Systems Design and Test Lab

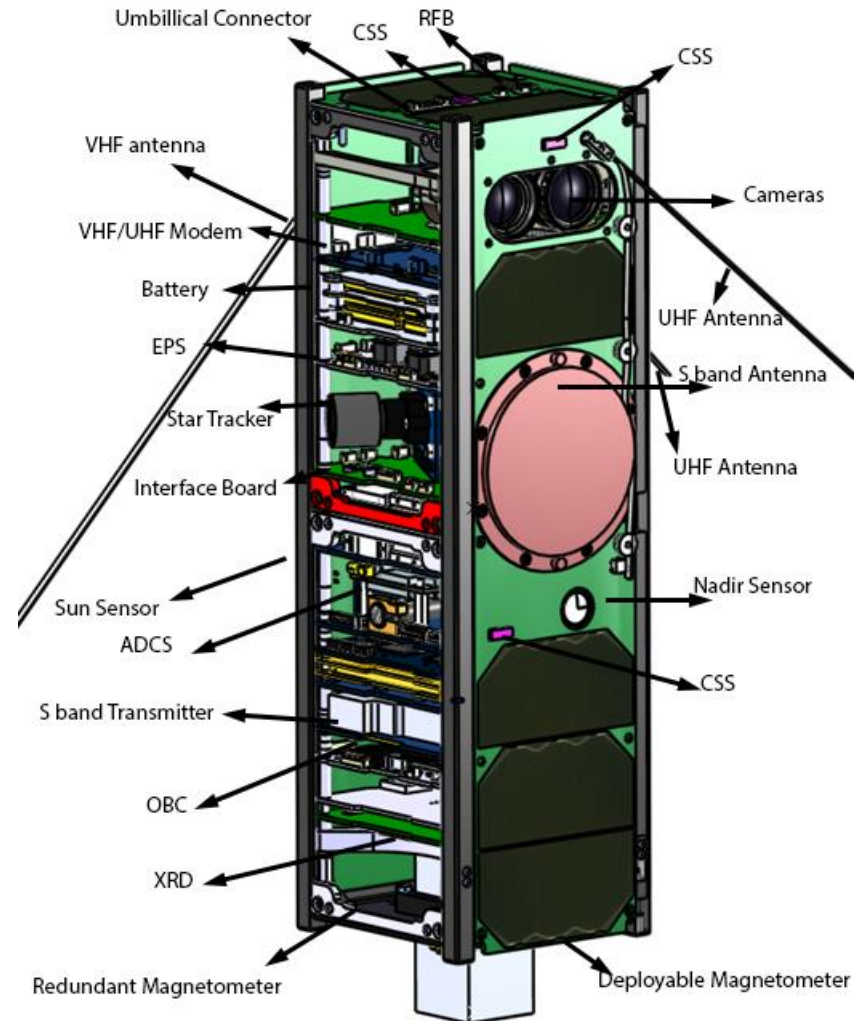
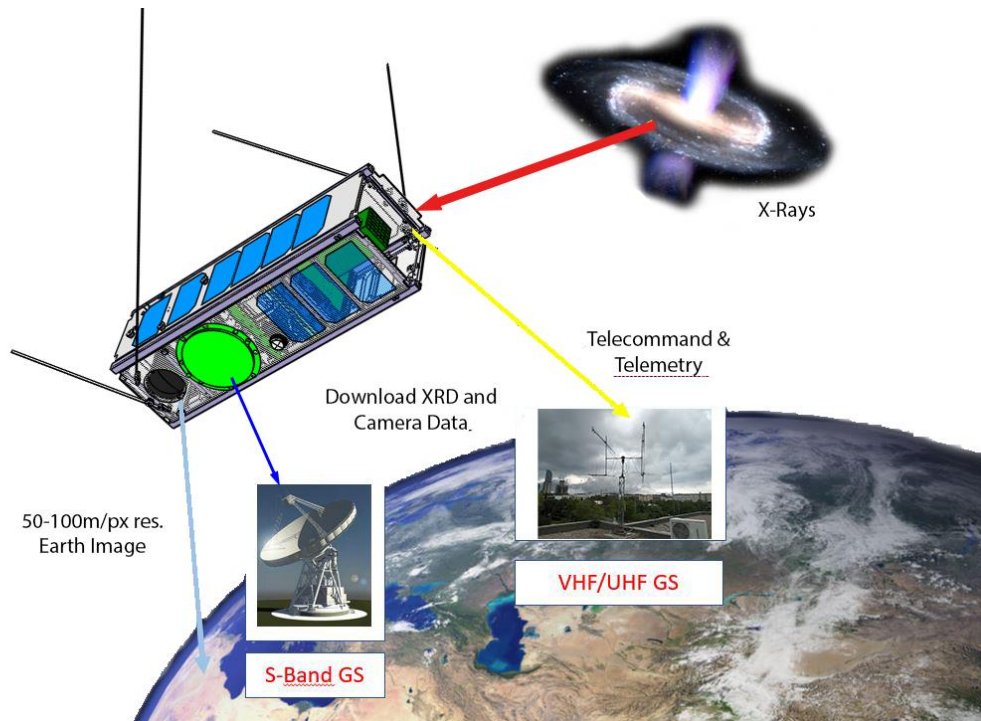


## İTÜ-SSDTL CUBESAT PROJECTS



- UNIVERSITY of SHARJAH, UAE
- Istanbul Technical University
- Sabancı University
- Capacity development through
  - Science mission: star detection and sun observation
  - Imaging mission: earth and space
- Payload
  - X Ray detector
  - Optical camera
- Launch 18 Dec 2022

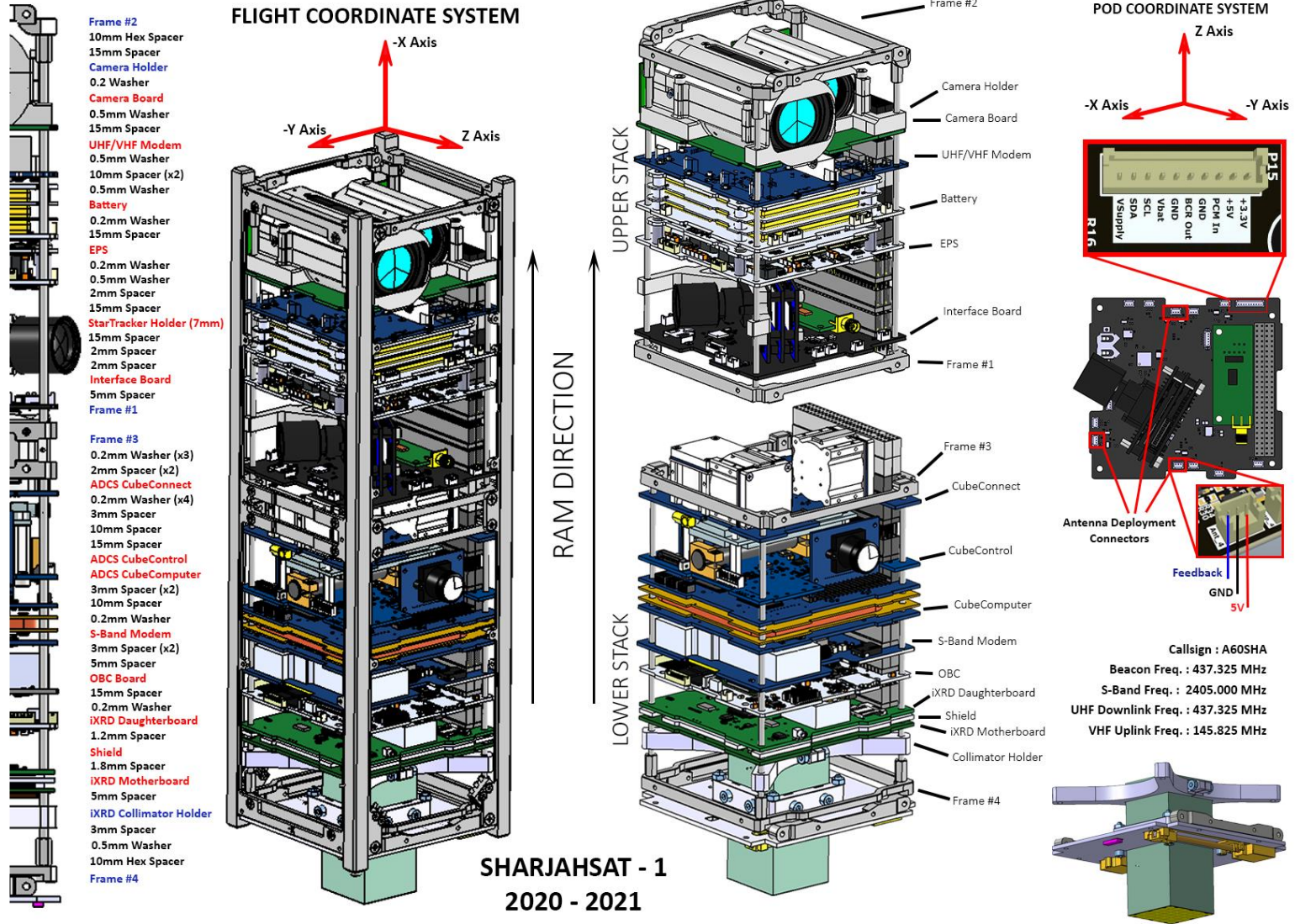
# SHARJAH SAT -1



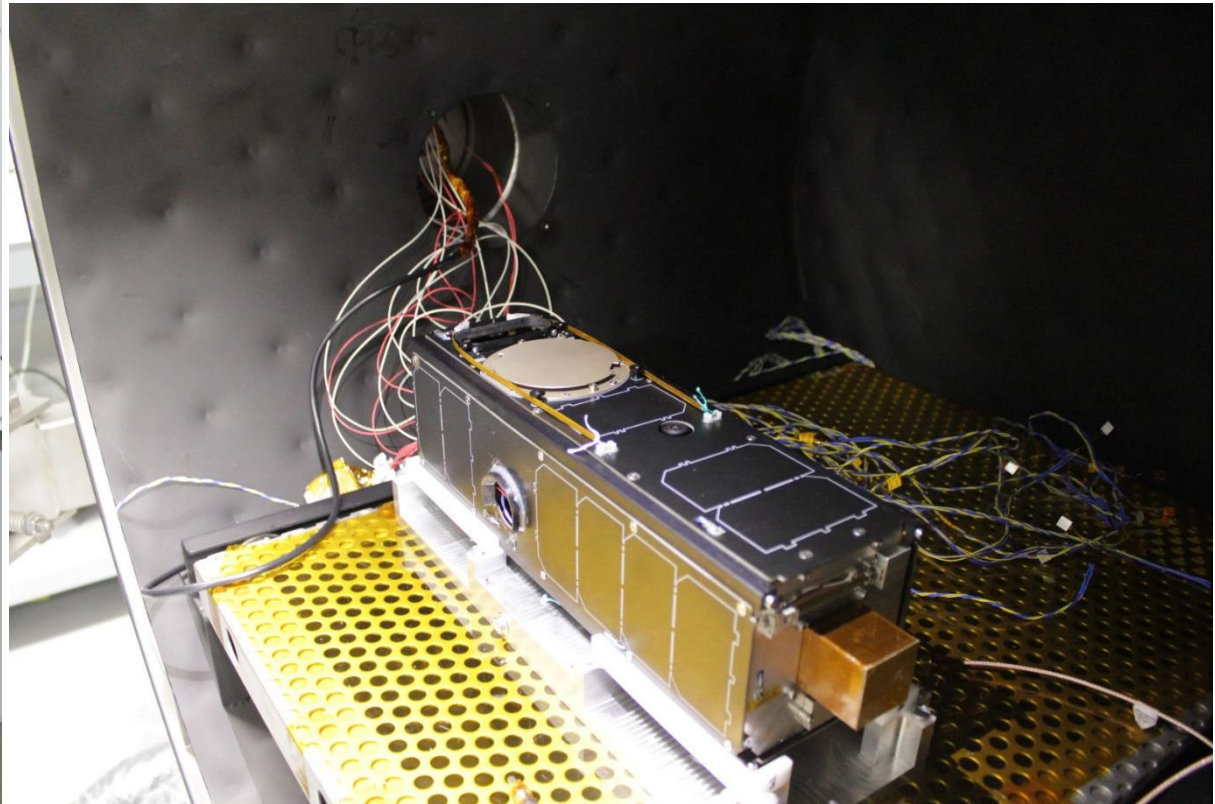




A poster displaying the components and their placements is prepared in Adobe Photoshop.





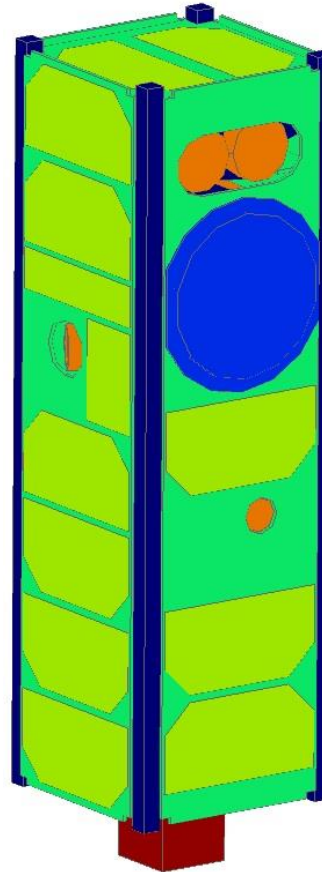




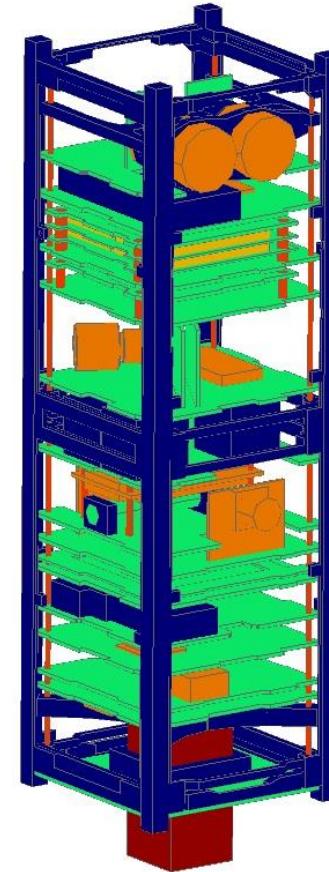




CAD model



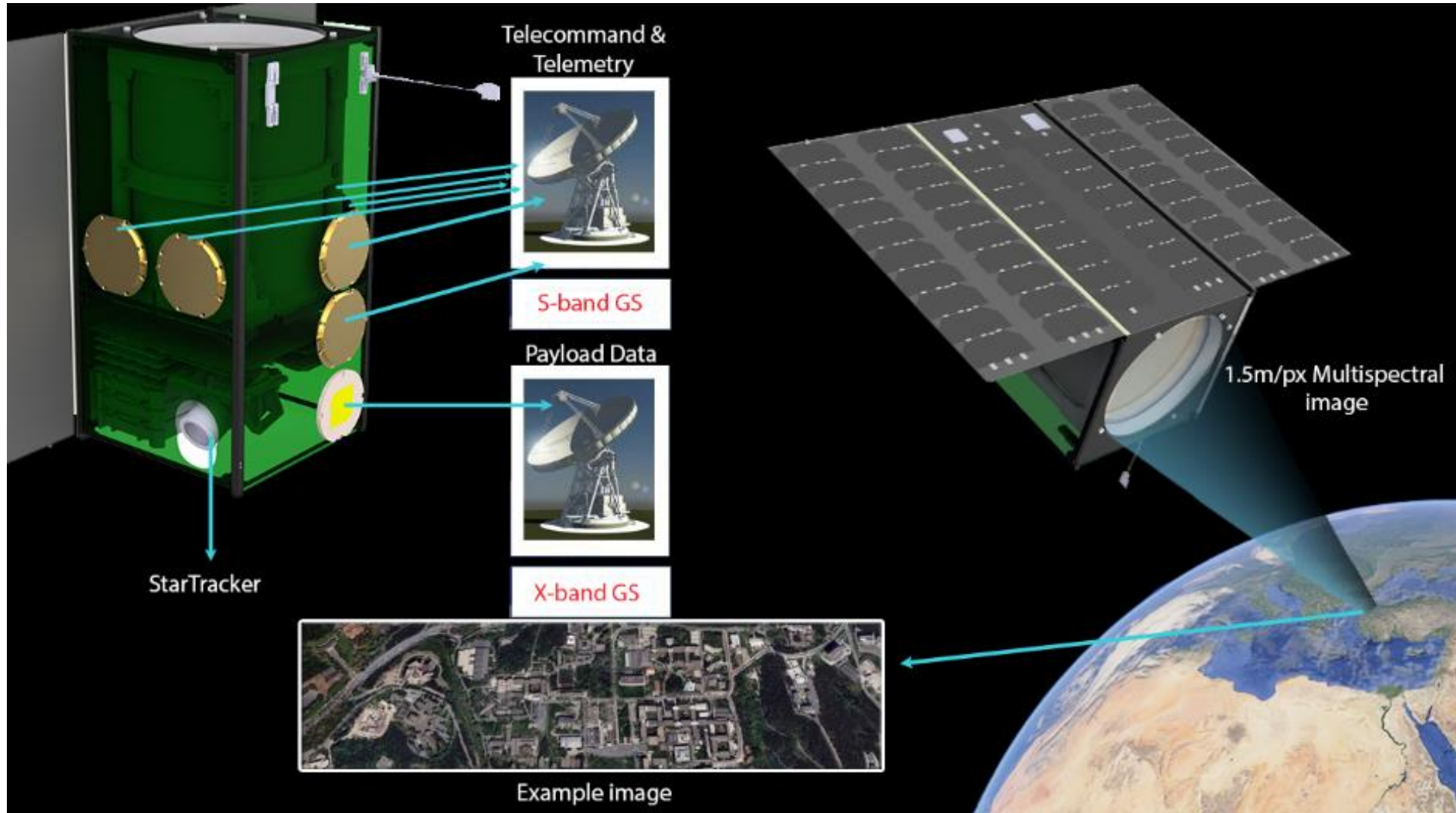
Thermal model



Thermal model interior

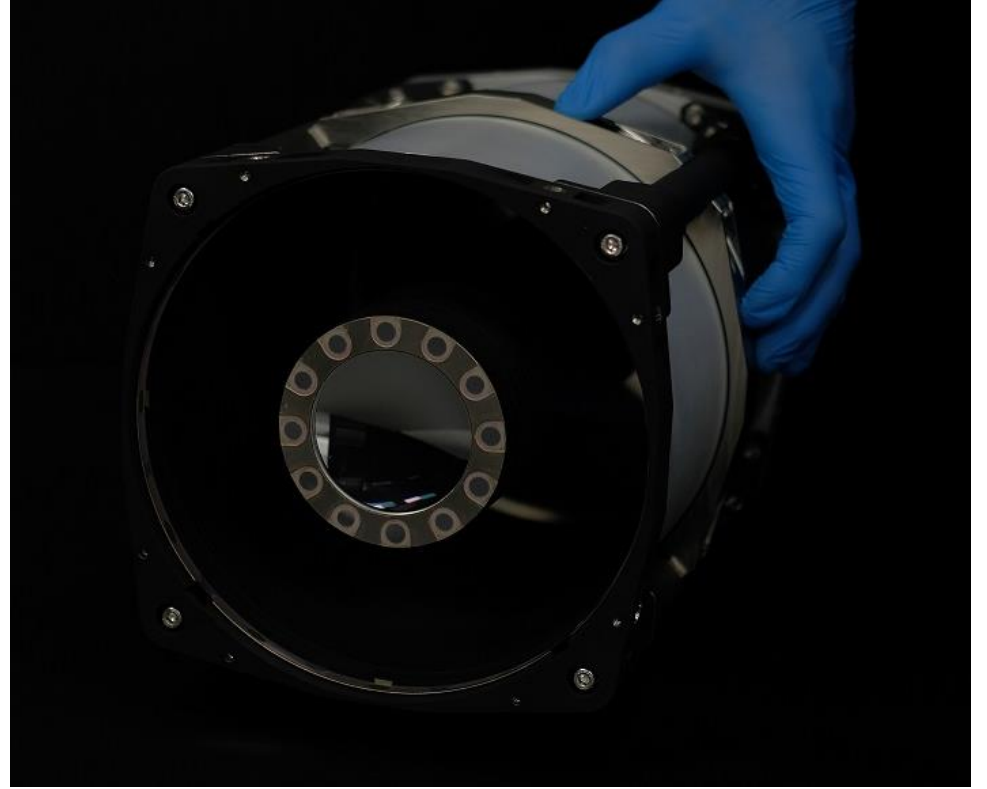
Physical properties material	
AL 7075	
Berillium	
CdZnTe	
Ceramic	
Copper	
Gallium Arsenide	
NiMH	
Silica	
Steel A4	
Tungsten	

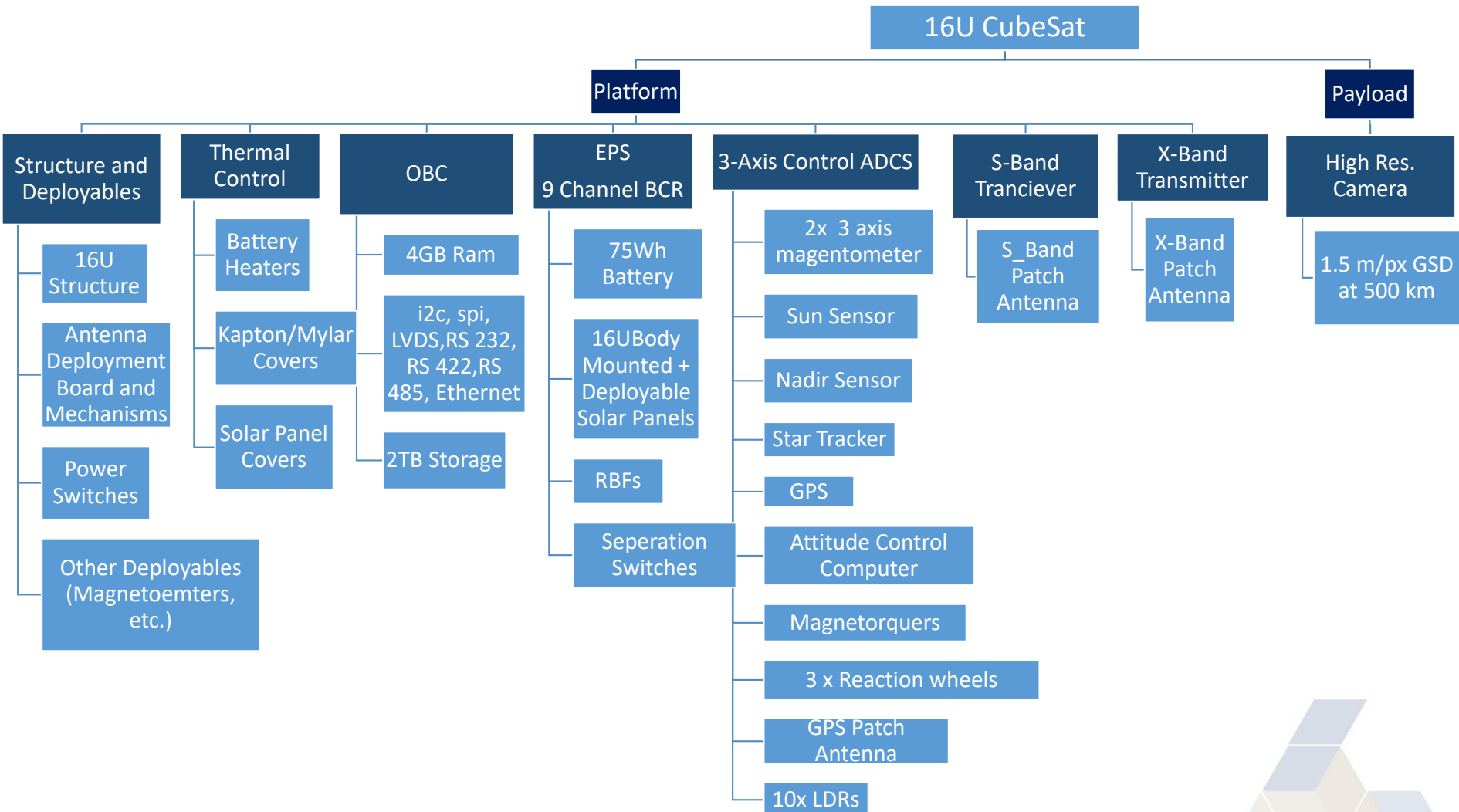
# 1.5M GSD at 500 km Earth Observation Mission

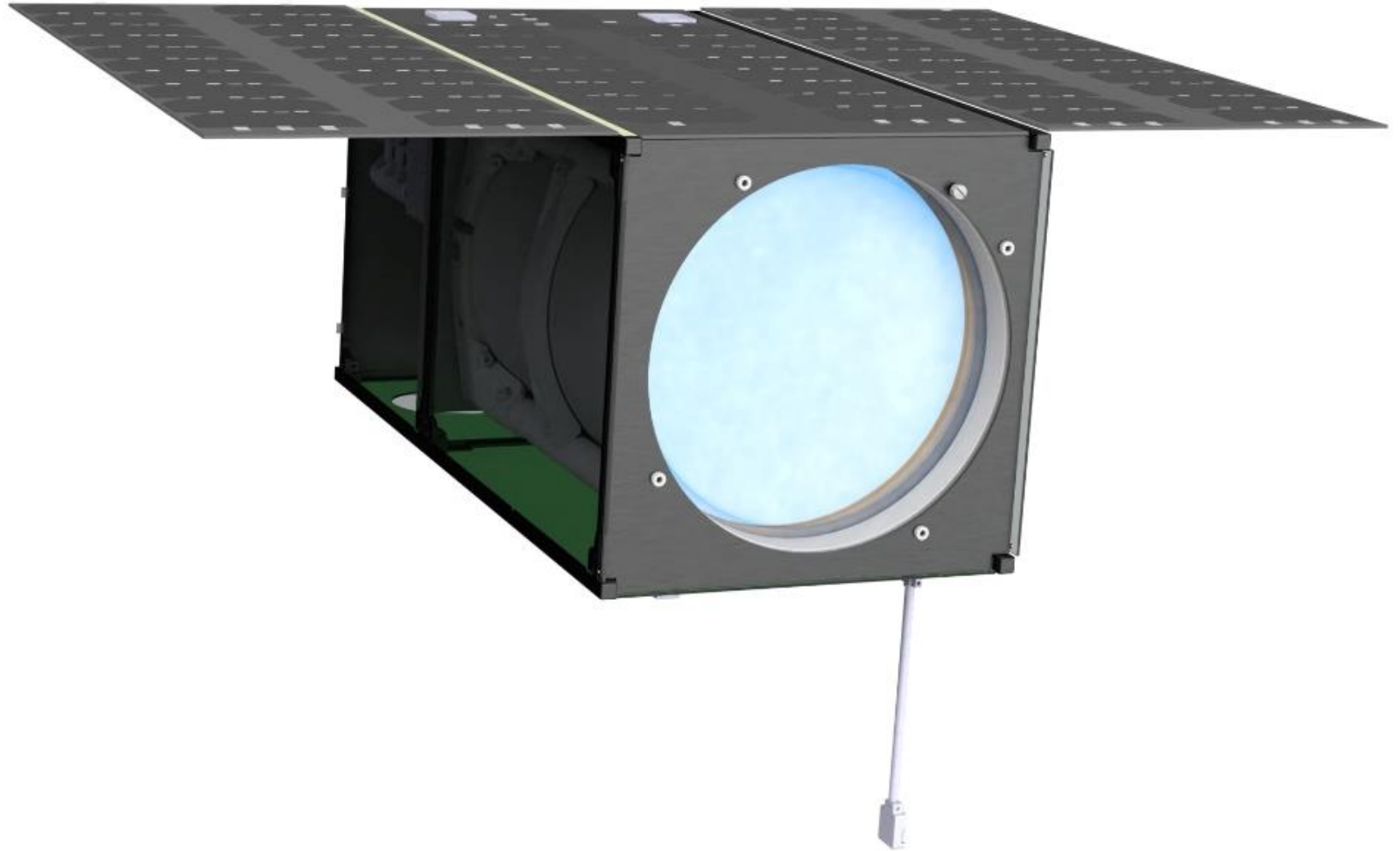








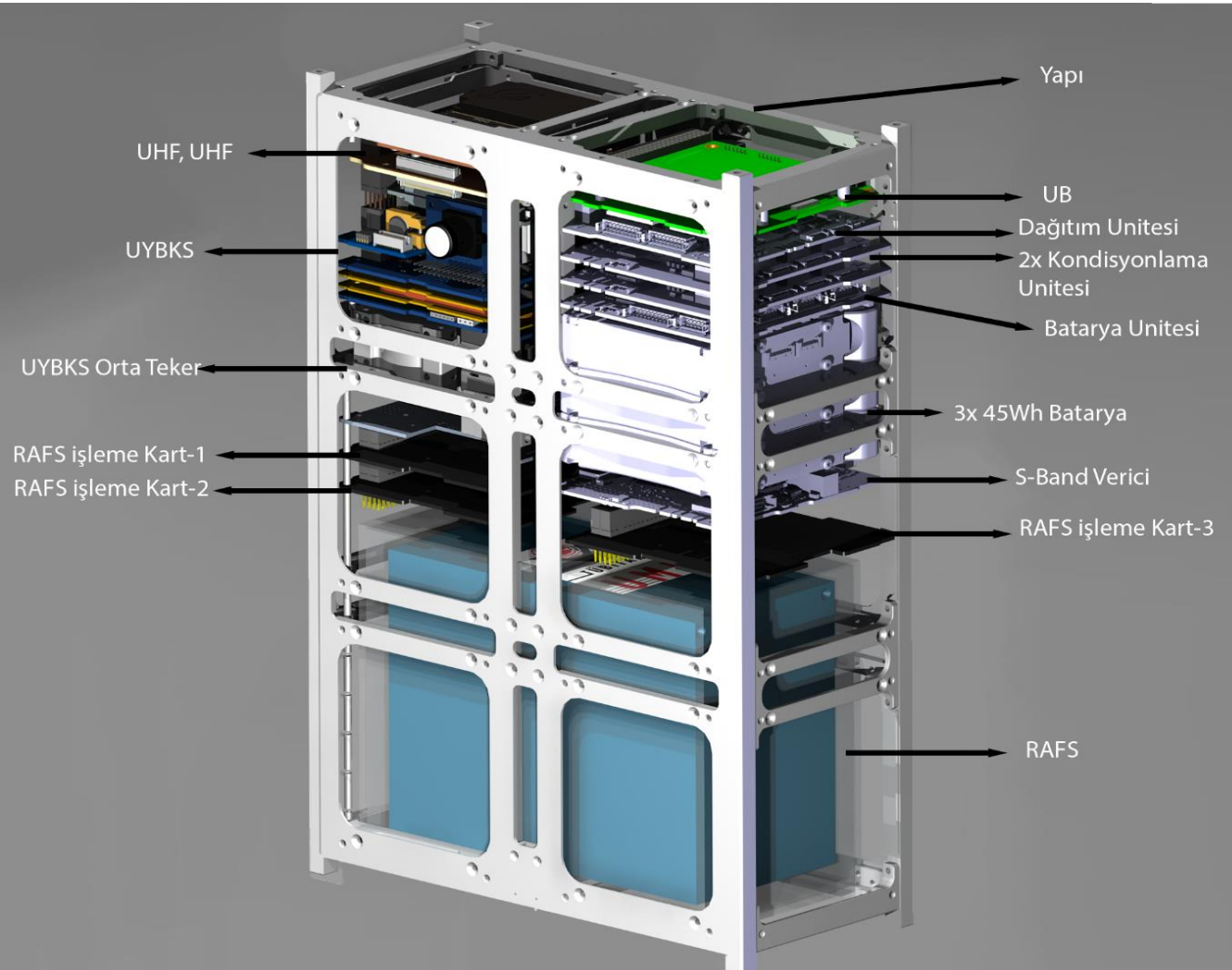






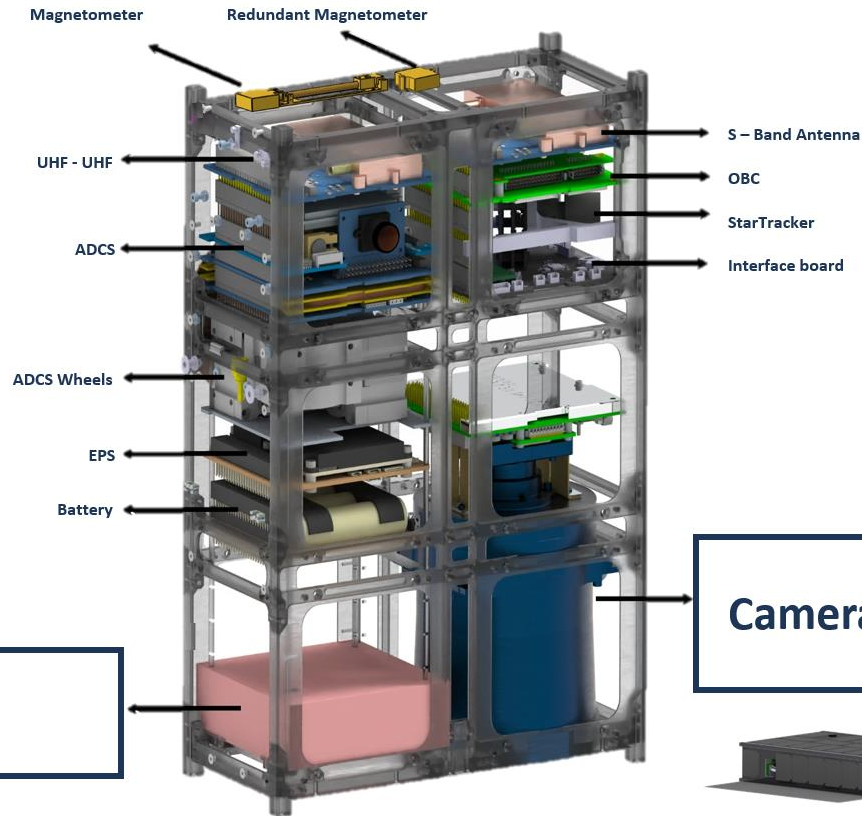


# Rubidium Atomic Frequency Standard (RAFS) CubeSat



- RAFS Payload
- RAFS
  - RAFS **signal transfer**
- RAFS ve Sat **thermal management**
- 6U Structure
- OBC and interfaces
- EPS
  - Battery (135Whr)
  - Panels 75W
  - PDCU
- Comm
  - UHF-UHF trcv, antenna
- ADCS, wheels
- **Imaging**

## The CUBESAT



Camera



### Technical Specs

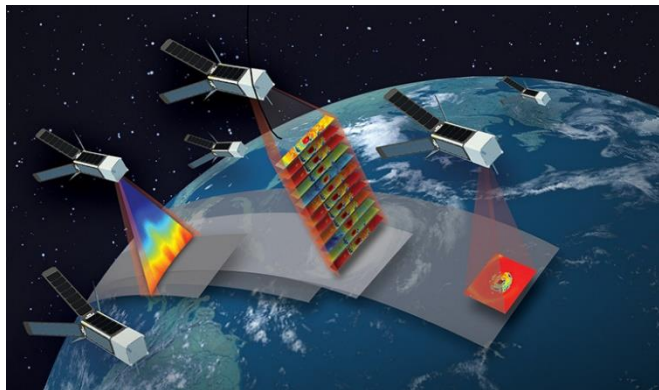
Altitude / Orbit	500-600 Km
Mass	Max 12 kg
Dimension	10*22*34cm
Resolution	5m GSD /500 km
Mission Duration	3 years min
Orbital Period	98 min
Revisit Time	1-4 days
Budget	~3M USD

1x GPGPU board  
1x Interface Board

# Rubidyum Atomik Frekans Standardı (RAFS) Görev Yüklü Küp Uydu (CubeSat) Geliştirilmesi Projesi



## AVT-336 (RSM) Enabling Platform Technologies for Resilient Small Satellite Constellations for NATO Missions



Team leader(s):	A.R. Aslan (TUR) V. Wickramasinghe (CAN)
Panel Mentor:	M. Huggins (USA)
Members:	AUS, CAN, DEU, DEN, ITA, NLD, NZL, PRT, SWE, TUR, USA
Duration:	Jan 2019 - Dec 2021
Coordination:	SCI Panel, NATO Organizations
Related activity	SCI 318, AVT-ET-181, AVT 257

### Objectives:

A Technical Team is proposed to further communicate and advance enabling platform technologies for resilient small satellite constellations for NATO missions by organizing a Specialized Meeting in 2021.

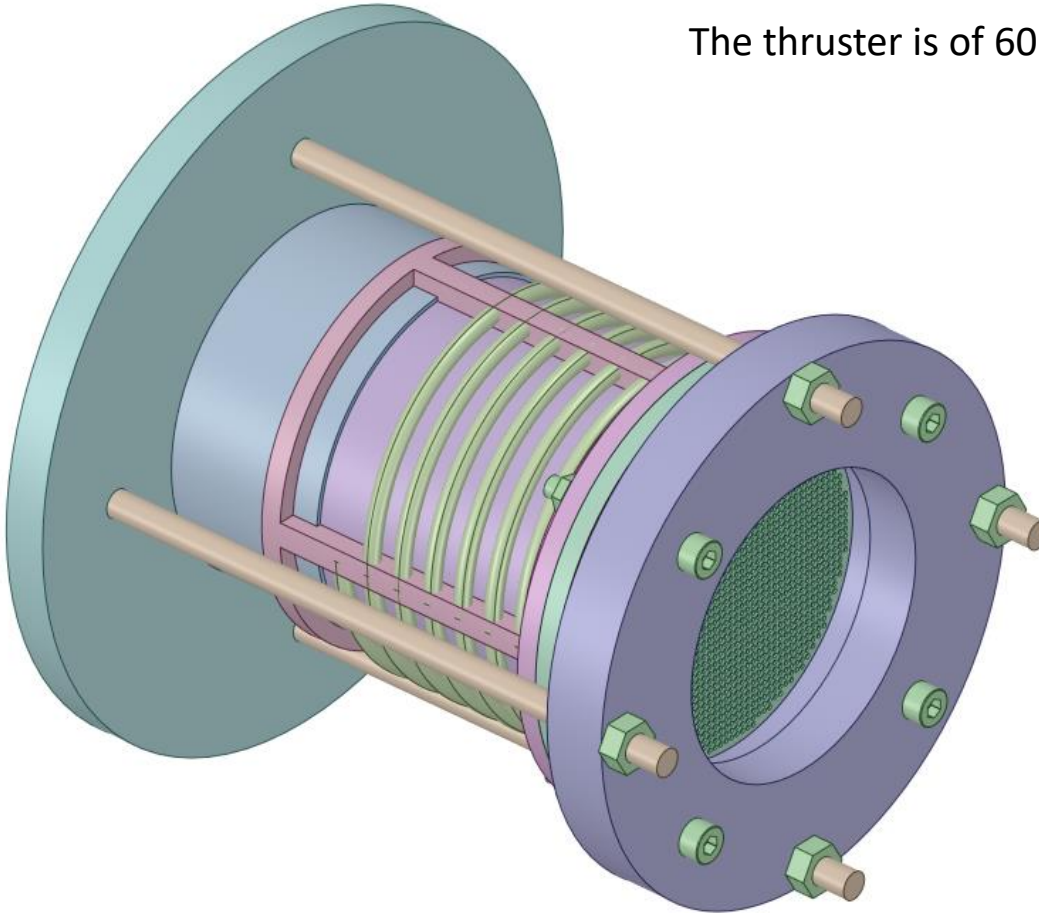
### Deliverable:

Report on exploiting enabling platform technologies for resilient small satellite constellations in order to enhance the quality and timeliness of information provided to NATO warfighters

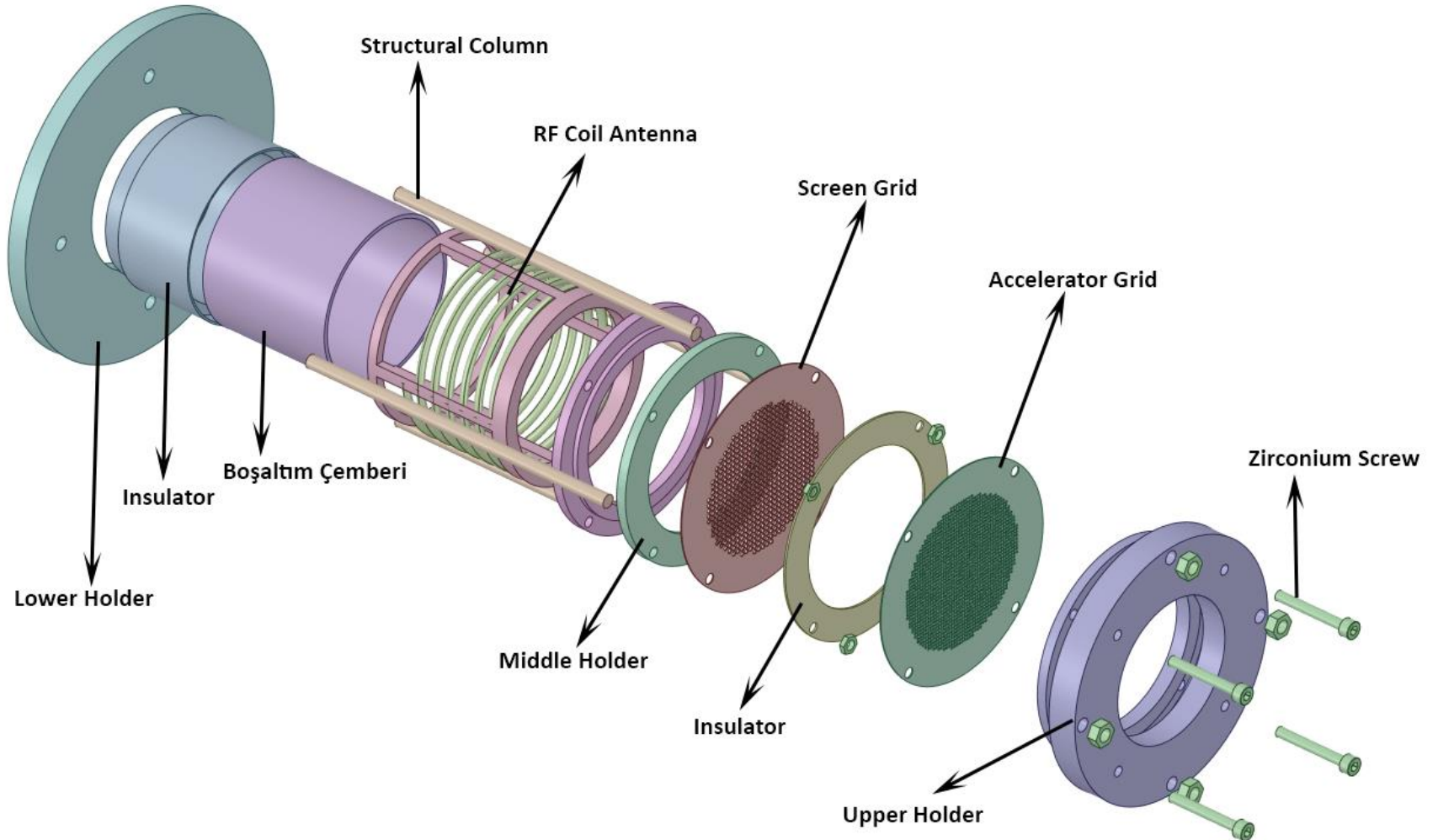
### Impact and Exploitation DOTMLPFI

- Directly advances technology for two Long Term Aspects defined in the 2015 STB Science & Technology Priorities, i.e. “Intelligence Surveillance and Reconnaissance (ISR) Collection Capability” and “Space Capability Preservation.”
- Enhances space capability and availability of Smallsats, for various NATO missions including communications, geo-positioning and ISR
- Identifies viable new approaches and techniques consistent with SmallSat Constellation Platform Technologies to more completely access the benefits of Smallsats to support the warfighter

The thruster is of 60mm diameter and 109 mm height

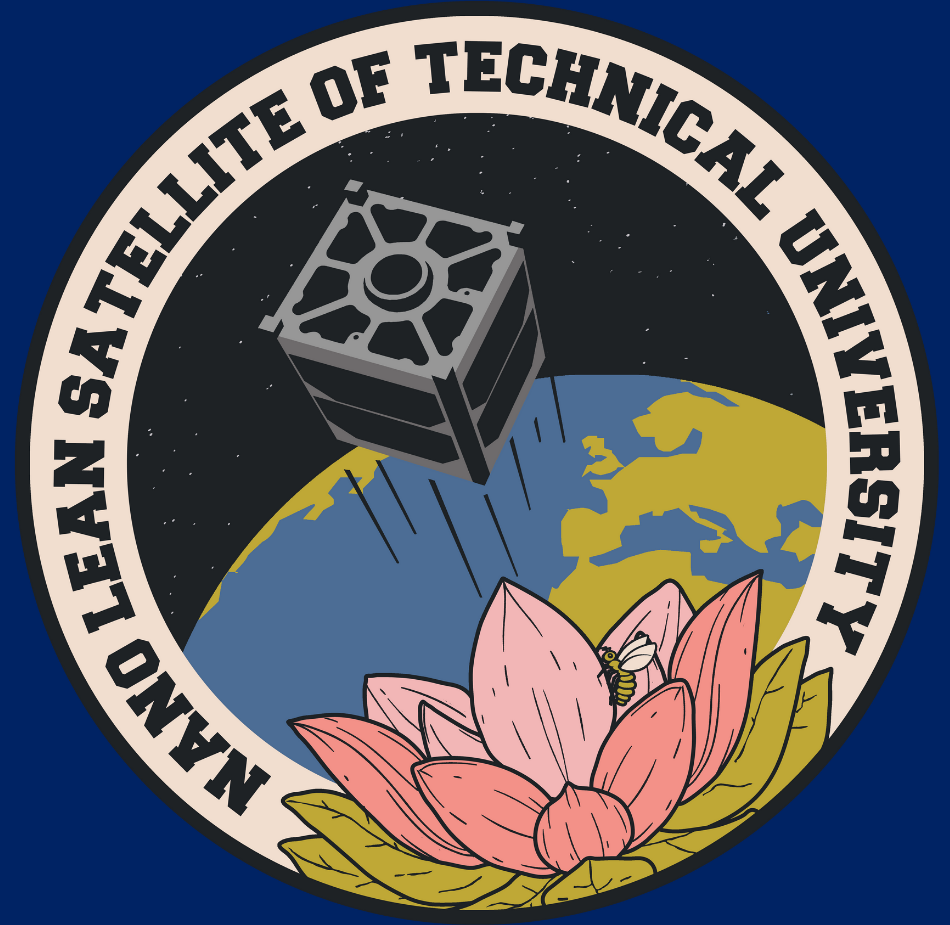






# n-LOTUSat

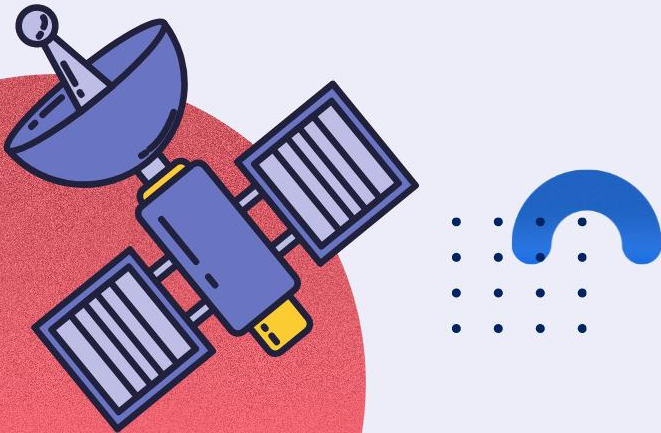
A 1U CUBESAT PROJECT





# WHO ARE WE?

- "Nano Lean Satellite of Technical University"
- 1U cubesat project
- Developed by undergraduate students from with CanSat experience







# OUR GOALS

- To gain interdisciplinary experience in the development stages of a cubesat
- To practise aerospace engineering in undergraduate level
- To develop our own electronic systems & designs, and gain flight heritage to them



# MISSION

## MAGNETOMETER PRODUCTION

- designing and manufacturing our own sensor

## DOSIMETER

- COTS
- data analysis after launch

## MAGNETOMETER PRODUCTION

- COTS
- software & algorithm development





# PLAN-S SATELLITE & SPACE TECHNOLOGIES



- Establishment Summer 2021
- IoT and EO Constellations
- Building tech demo missions
- 3U and 6U CubeSat



# ABOUT US

Kontrolmatik  
Technologies

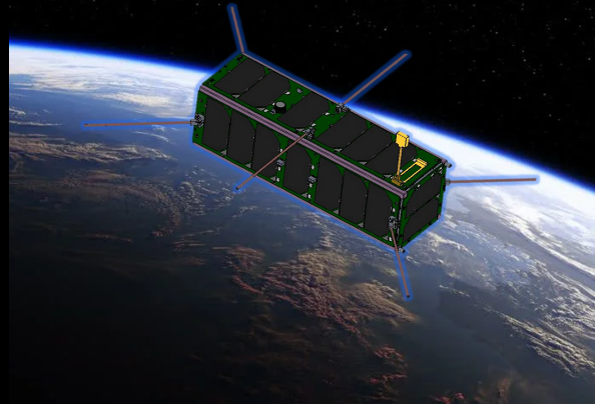


INFINIA

Plan-S Satellite and Space Technologies, established in 2021 with the partnership of Kontrolmatik and INFINIA and started its operations in New Space applications.

Plan-S designs and builds nano-satellites for low-earth orbit, small satellites for its customers and aims to offer end-to-end Satellite as a Service solutions.

Plan-S has already signed the launch agreements to send three test satellites into orbit in the 2022.



As Turkey's largest private initiative in the field of satellite and space technologies, Plan-S aims to

- develop satellite technologies and satellite subsystems,
- provide satellite based IoT services as one of its primary business lines
- offer innovative solutions in areas where conventional communication is insufficient
- become leader in satellite service technologies



# INVESTMENTS



We started building our R&D facility and it will be ready by the Q4 of 2022;

- 9000 m2 in total
- 10.000 class clean room
- 100.000 class clean room
- TVC, Vibration and Climatic Test Chambers/Equipments
- EMI/EMC & Antenna Measurement Laboratories
- Electronic and Mechanical Laboratories



## ROADMAP

June, 2022

Connecta Test Satellite #1.1



Test satellite for low power  
communication trials with IoT devices

Size: 3U

December, 2022

Connecta Test Satellite #2.1 &amp; #2.2



2 test satellites for earth observation  
with high resolution cameras & narrow  
band comm. trials with IoT devices

Size: 6U & 6U

Q4, 2023 and Beyond

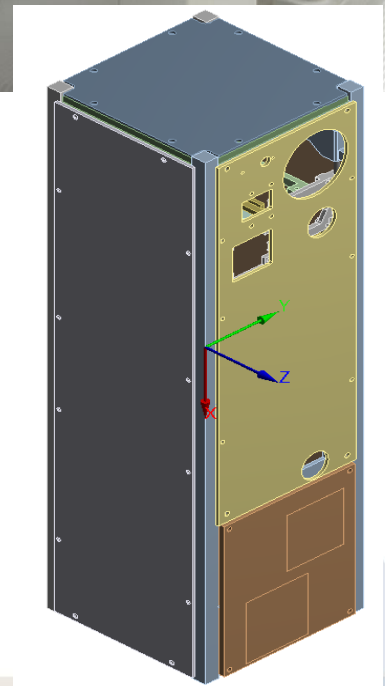
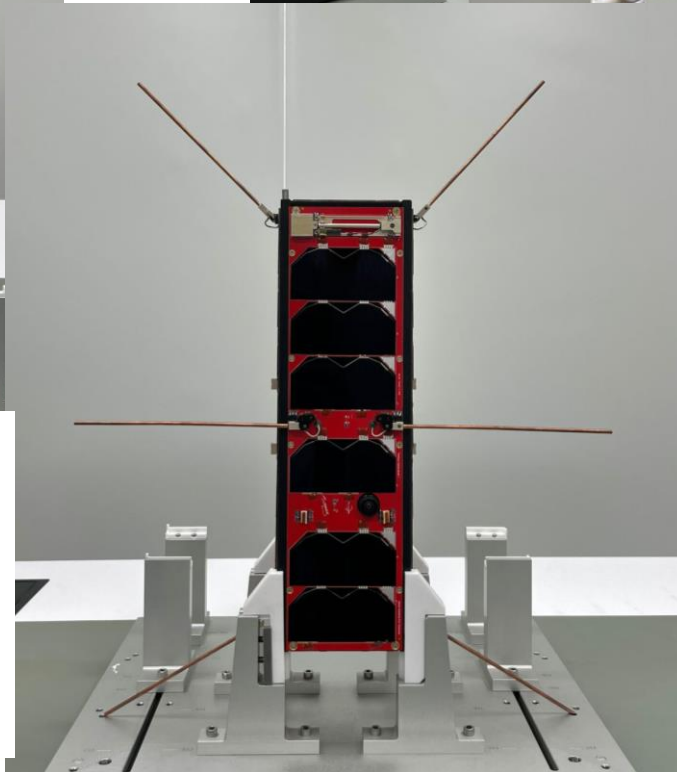
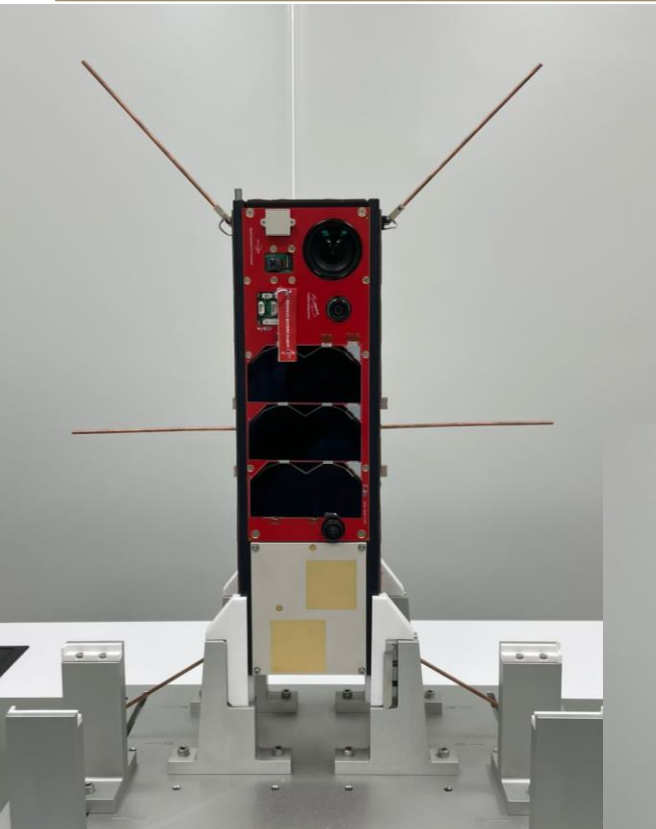
Connecta IoT Satellite Constellation



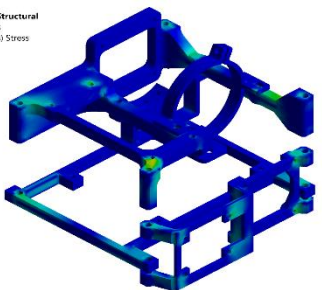
Narrow band IoT connectivity  
Global coverage

Size: TBD

# of Sat: >100



F: Copy of Copy of Static Structural  
Equivalent Stress: Piorackets  
Type: Equivalent (von-Mises) Stress  
Unit: MPa  
Time: 1  
Max: 12.738  
Min: 2.8421e-5



0.00 20.00 40.00 60.00 80.00 (mm)



## ROADMAP

June, 2022

Connecta Test Satellite #1.1



Test satellite for low power  
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2 test satellites for earth observation  
with high resolution cameras & narrow  
band comm. trials with IoT devices

Size: 6U & 6U

Q4, 2023 and Beyond

Connecta IoT Satellite Constellation



Narrow band IoT connectivity  
Global coverage

Size: TBD

# of Sat: >100



# MISSION DEFINITION OF CONNECTA T2.1

Connecta T2.1 is a technology demonstrator for detection, early warning and management of forest fires and natural disasters like floods and landslides.



## ROADMAP OF THE PROJECT

### PHASE-A

#### Connecta T2.1 Mission

Tech. Demonstrator & Development Platform

### PHASE-B

Design and Development of the System  
(Satellites & Ground Equipments)

### PHASE-C

Deployment of the Constellation, Installation  
of the Complete System & Operation



Forest Fire - South Coast of Turkey



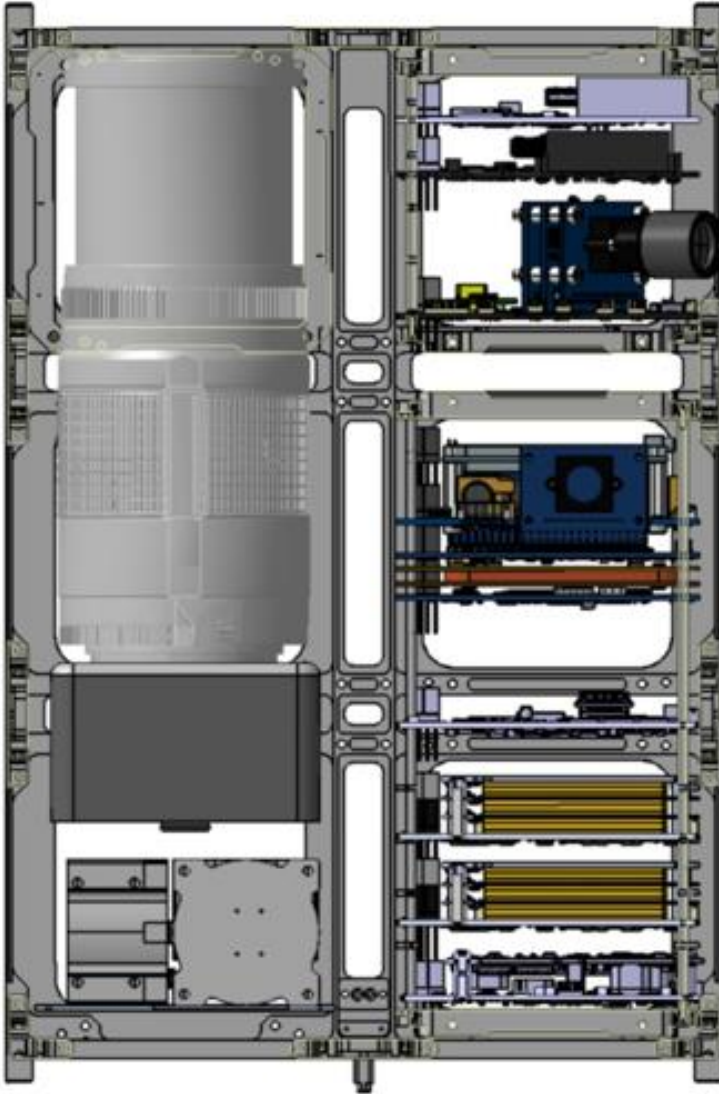
Flood- North of Turkey



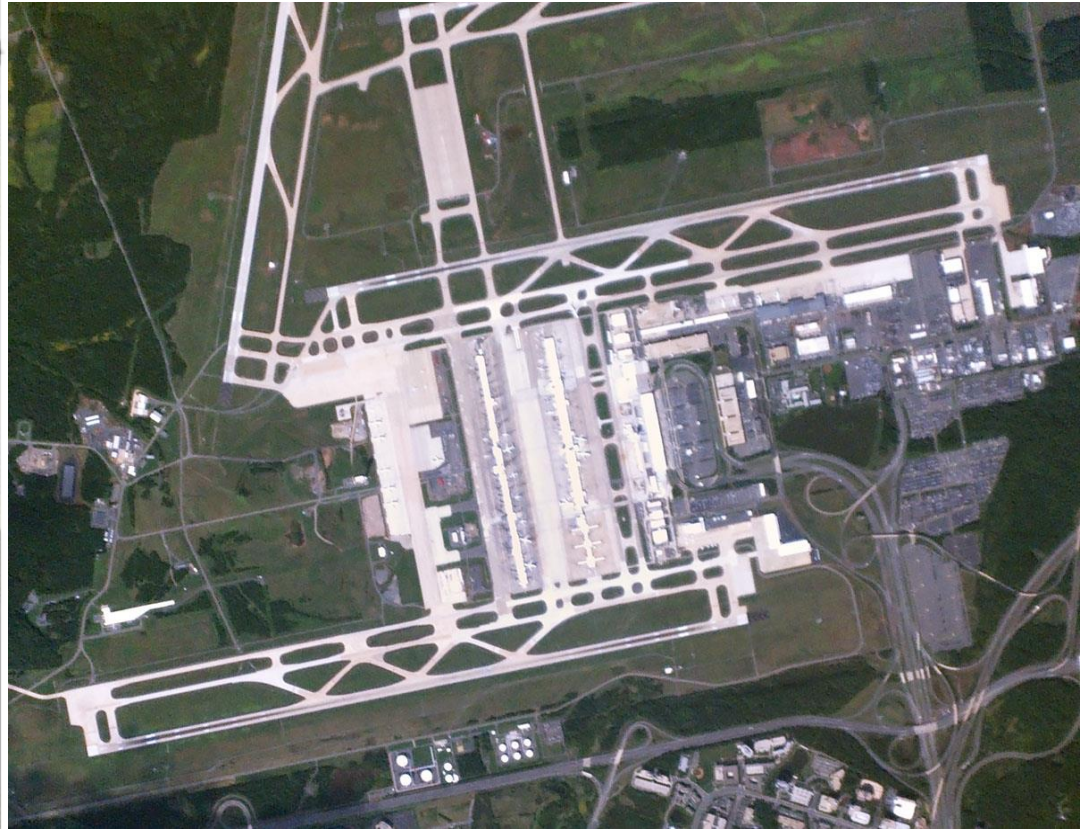
Landslide- North of Turkey



# 6U CubeSat for EO, <5m



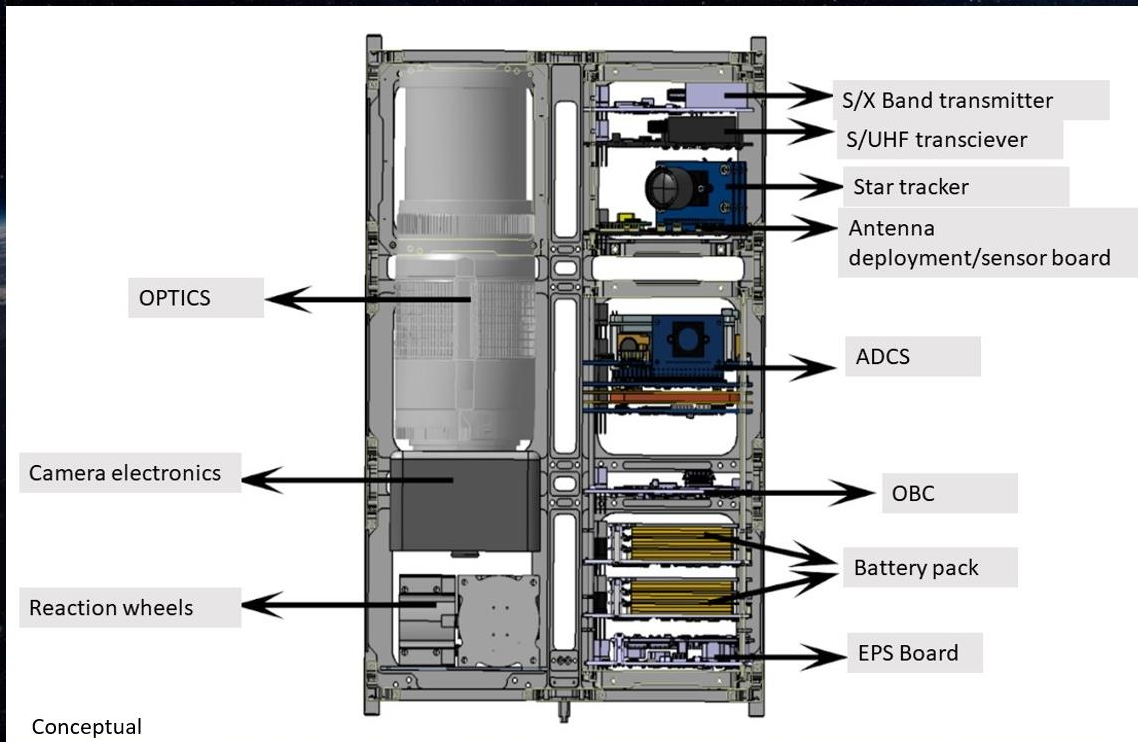
Reference image



# CONNECTA T2.1 MISSION



CONNECTA T2.1 is a 6U Cubesat for technology development, test and on-orbit demonstration for the aimed Project.



CONNECTA T2.1 will be a software defined satellite and will serve as a test and development platform.

It will have high resolution multispectral camera to take pictures of the areas under interest.

It will have connectivity with sensor nodes to collect relevant data and ground terminals to share early warning messages.



# PARTNERSHIPS

Partner on Satellite Design,  
Development & Testing



Istanbul Technical University  
Space Systems Design and Test Laboratory

Potential Partner on Multispectral  
Cubesat Cameras



Dragonfly Aerospace  
Caiman Award Program

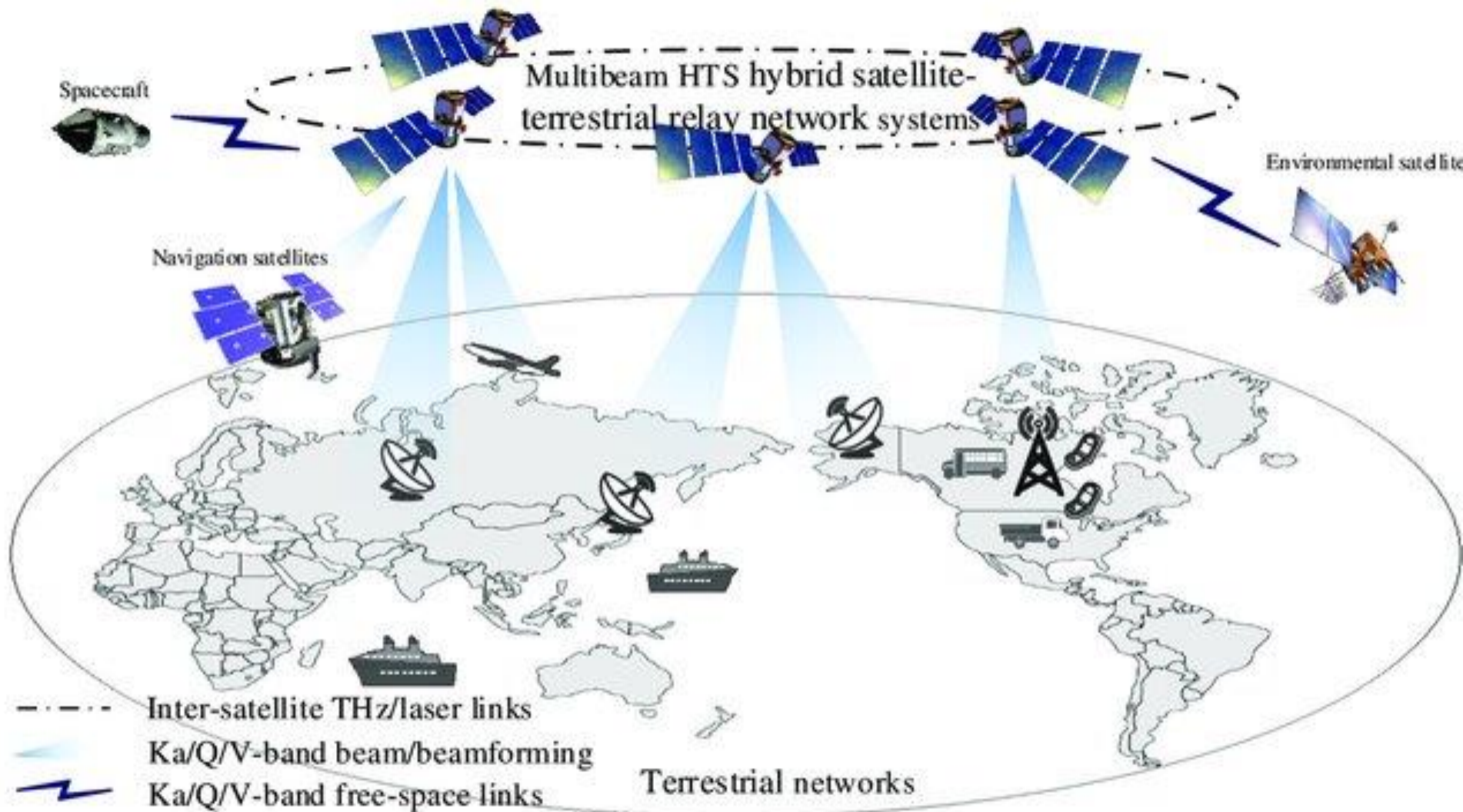


SATELLITE & SPACE TECHNOLOGIES

Potential Partner on Image  
Processing & Machine Learning



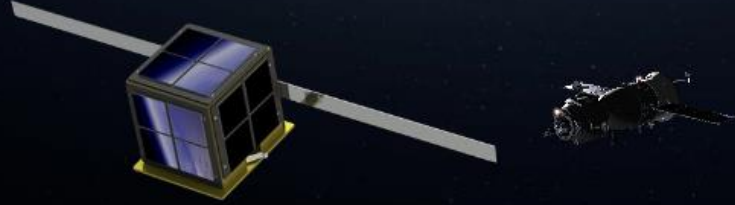
İhsan Doğramacı Bilkent University  
Electrical & Electronics Engineering Dept.





# Project.X

## Türkiye'nin ilk PocketCube Projesi



### grizu-263A (grizuSAT)

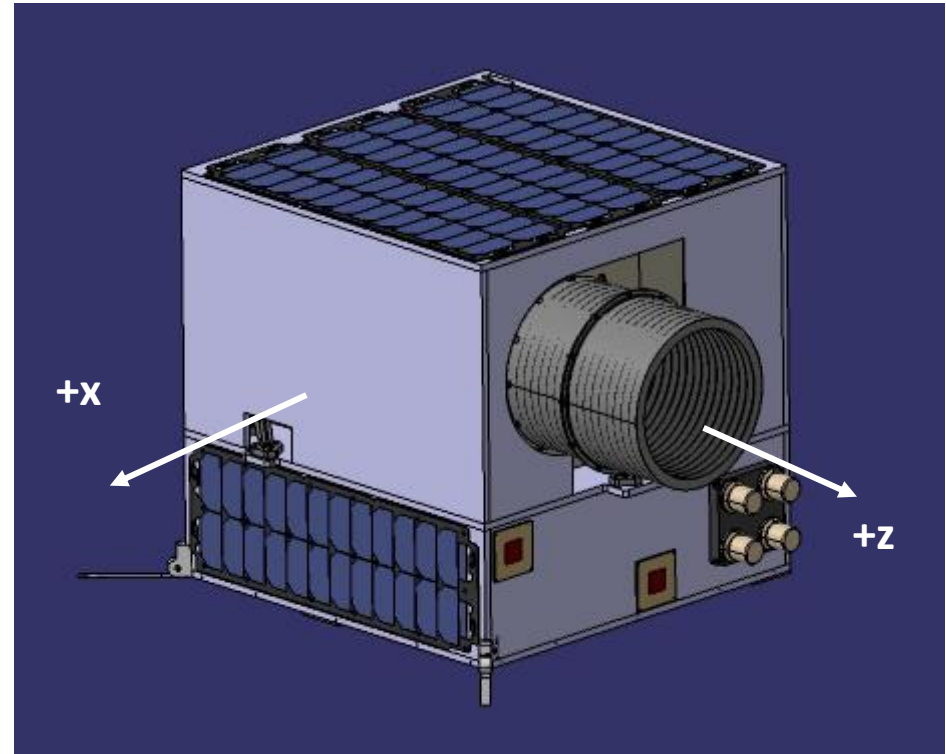
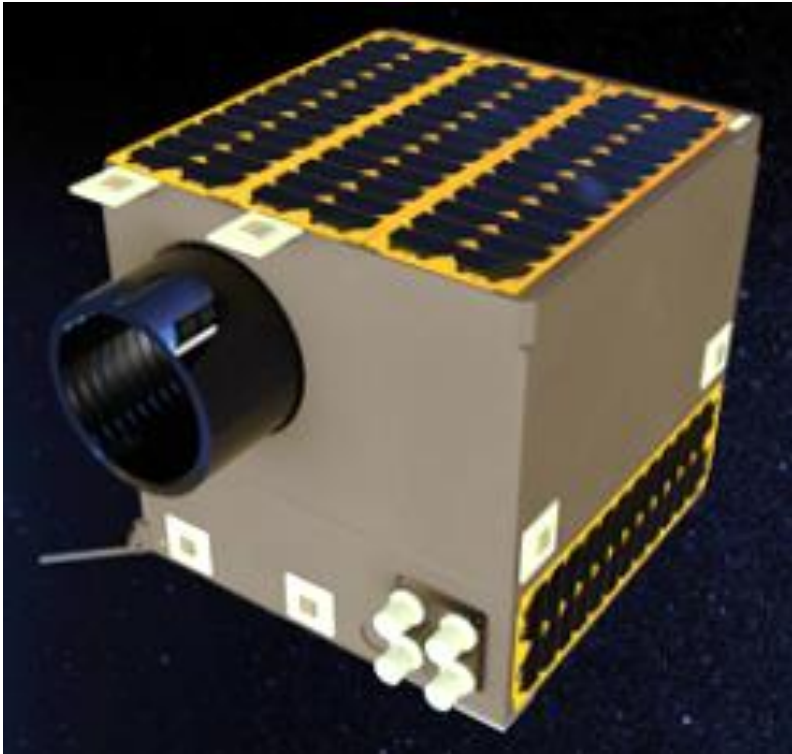
grizu-263A (grizuSAT) Türkiye'de üretilen ilk pocketcube projesidir. 5x5x5 cm boyutlarında olacak olan küp şeklinde bu uydunun üretimi tamamen Zonguldak Bülent Ecevit Üniversitesi'nde gerçekleştirilecektir. Proje 2018 yılı CanSat Competition Dünya 2.si olan grizu-263 Uzay Takımı tarafından başlatılmıştır.

Uydu 2020 yılının ortasında fırlatılacak ve 500 km yükseklikte yörüngeye yerleştirilecektir.



Supporters





Hi Res EO, PAN <2m, MS<8m

Micro Sat, <70kg, operational satellite

- CANSAT/CUBESAT Design and development WORKSHOPS in
- Turkey (many cities)
- UAE (Uo Sharjah)
- Jordan, ISNET
- Lebanon
- Sri Lanka
- Pakistan
- Morocco, ICESCO
- Efforts towards UN UN 2030 goals



## MODEL UYDU İMALAT EĞİTİMİ VE TASARIMI

### III. CanSAT Uygulaması

**CanSAT Nedir?**  
Amerika Birleşik Devletleri'nden dünyaya yayılan bir kavramdır. İngilizce "Can" ve "Satellite" sözcüklerinin birleşiminden meydana gelmiştir. Diğer anlamı ise Model Uydu anlamına sahiptir. Model uydu modern uyduların temeli oluşturan yapıların modellenerek öğrencilere tanıtılması ve merak uyandırması düşüncesiyle bugün Dünya'nın pek çok yerinde yarışması yapılan bir etkinlik türüdür. Gerçek uyduların aksine, boyutları (330 mililitrelik kola şişesi) ve kütlesi en fazla 350 gr olan ve bir araştırma roketi ile çok düşük irtifaya (1000 m den az) çıkarılan minyatür uydudur.

**CanSAT Temelli Uzak Eğitiminin Hedefi**  
Uzay mühendisliği ve bilimleri alanında yetişmiş insan gücünü artırmak amacıyla CanSAT tasarımı ve imalatını bir eğitim aracı olarak kullanmaktır. Türkiye'de CanSAT projeleri gerçekleştirilecek ve uluslararası CanSAT yarışmalarına katılabilecek kişi sayısını artırmak amacıyla katılımcıları CanSAT tasarımı ve imalatı konusunda uygulamalı olarak eğitmektir. Bu eğitime katılan kişilerin üniversite ve kurumlarına döndükten sonra CanSAT projelerine liderlik ve danışmanlık yapmaları beklenmektedir.

**AMAC**  
CanSAT eğitimi, uzay sistemleri alanında kendini geliştirmek isteyen farklı disiplinlerden öğrencilere uydu tasarımı ve uydu teknolojileri geliştirme konusunda ileride karşılaşılabilecekleri sorunları önceden göstermek, onlara çözümü yaklaştıran bir zihin yapısı ve tecrübe kazandırmayı amaçlayan uygulamalı bir model uydu tasarımı ve üretim yöntemidir. Böylece, uzay teknolojileri ve uygulamalı uzay mühendisliği alanında en etkili eğitim verme biçimidir. Katılımcılara ekip çalışması yapma fırsatı ve disiplinler arası sistem mühendisliği ile kendi uydularını tasarlama, imal etme ve fırlatma fırsatı sunmaktadır.

**CanSAT Eğitim Adımları**  
Görev Analizi ve Sistem Geliştirme  
Donanım Entegrasyonu  
Yazılım Geliştirme  
Mikrodenetleyici Programlama  
GPS Entegrasyonu  
Güneş Paneli Entegrasyonu ve Güç Sistemi  
Telemetri Sistemi Entegrasyonu  
Alçalma ve İniş Sistemleri Tasarımı  
Mekanik Tasarım  
Yer İstasyonu Geliştirme  
Test ve Fırlatma  
Görev Sonrası Veri Analizi

**CanSAT Temelli Uzak Eğitiminin İçeriği**  
a. Etkili bir disiplinler arası eğitim aracıdır,  
b. Düşük Maliyetle proje geliştirilir,  
c. Görev analizi yapılarak proje süreçleri planlanır,  
d. Tasarım, imalat, test ve fırlatmaya kadar tüm süreç uygulamalı olarak tecrübe edilir,  
e. Risk analizleri yapılır,  
f. Görev sonu ve analizi yapılır ve görev başını durumu değerlendirilir.

**Kimler Katılabilir?**  
Uzay alanında çalışmak, bilgi sahibi olmak isteyen isteyen HERKES, özellikle savunma sanayii firma yöneticisi ve çalışanları, Mühendislik, Temel Bilimler, Astronomi ve Uzay Bilimleri, Uzay Bilimleri ve Teknolojileri öğrencileri veya mezunları katılabilir.





**TARİH**  
8-15 Ağustos 2016  
**YER**  
Yalova Üniversitesi  
Mühendislik Fakültesi  
Stadyum Karşısı  
77200 Yalova

**Kurs Ücreti:** 1500 TL  
Kurs ücreti, kurs dokümanlarını, uygulamalı dersleri, uydu yapımında kullanılan malzemeleri ve fırlatmayı içermektedir. Konaklama masraflarını içermez.

**Sponsorlar:**  
İLETİŞİM: bkilic@yalova.edu.tr, ali.dursun@yalova.edu.tr  
sunay.turkdogan@yalova.edu.tr





**5<sup>th</sup> YEAR**

**MODEL SATELLITE COMPETITION**

**ROCKET COMPETITION**

**FLYING CAR COMPETITION**

**ENVIRONMENT AND ENERGY TECHNOLOGIES COMPETITION**

**HELICOPTER DESIGN COMPETITION**

**JET ENGINE DESIGN COMPETITION**

**EDUCATIONAL TECHNOLOGIES COMPETITION**

**BIOTECHNOLOGY INNOVATION COMPETITION**

**SMART TRANSPORTATION COMPETITION**

**HIGH SCHOOL STUDENTS POLAR RESEARCH PROJECTS COMPETITION**

**AGRICULTURAL UNMANNED LAND VEHICLE COMPETITION**

**DIGITAL TECHNOLOGIES COMPETITION IN INDUSTRY**

**TRAVEL HACKATHON**

**UNMANNED AERIAL VEHICLE COMPETITION**

**SWARM ROBOTS COMPETITION**

**HETEROGENEOUS SWARM SIMULATION COMPETITION**

**FIGHTER UAV COMPETITION**

**TECHNOLOGY FOR HUMANITY COMPETITION**

**AGRICULTURAL TECHNOLOGIES COMPETITION**

**ROBOTAXI FULL SCALE AUTONOMOUS VEHICLE COMPETITION**

**UNMANNED UNDERWATER SYSTEMS COMPETITION**

**ARTIFICIAL INTELLIGENCE IN HEALTHCARE COMPETITION**

**TURKEY DRONE CHAMPIONSHIP**

**WORLD DRONE CUP**

**HACK BLACK SEA**

**ARTIFICIAL INTELLIGENCE IN TRANSPORTATION COMPETITION**

**COME AND JOIN US  
IN THE WORLD'S BIGGEST  
TECHNOLOGY COMPETITIONS**

- TURKISH NATURAL LANGUAGE PROCESSING COMPETITION
- PARDUS 21 DEBUGGING AND SUGGESTION COMPETITION
- HYPERLOOP DEVELOPMENT COMPETITION
- ISIF
- ROBOTICS COMPETITIONS
- TAKE OFF INTERNATIONAL STARTUP SUMMIT
- DOCTORATE SCIENCE AWARDS
- TOURISM TECHNOLOGIES COMPETITION
- VERTICAL LANDING ROCKET COMPETITION
- BARRIER-FREE LIVING TECHNOLOGIES COMPETITION
- HIGH SCHOOL STUDENTS CLIMATE CHANGE RESEARCH PROJECTS COMPETITION
- UNIVERSITY STUDENTS RESEARCH PROJECTS COMPETITION

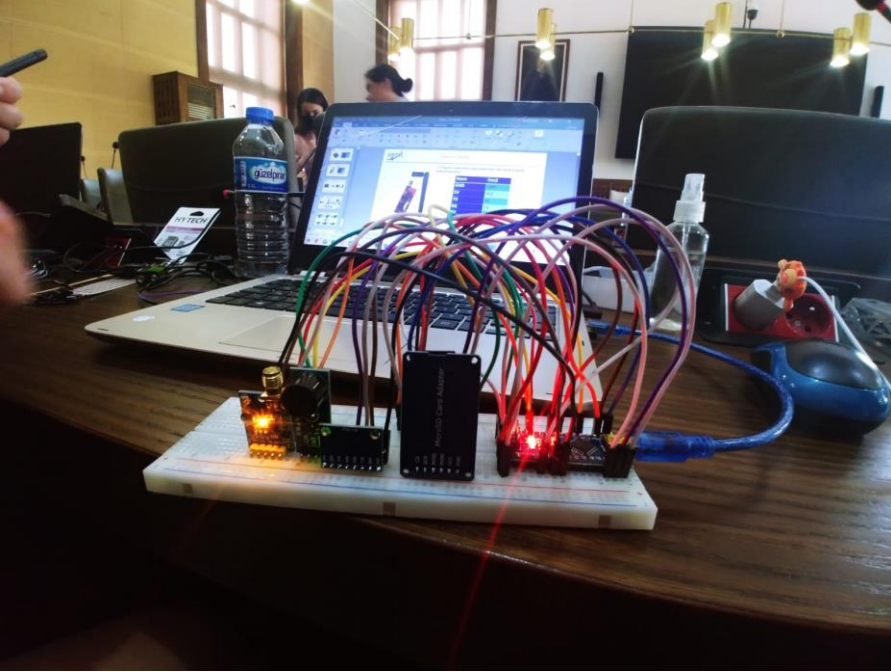




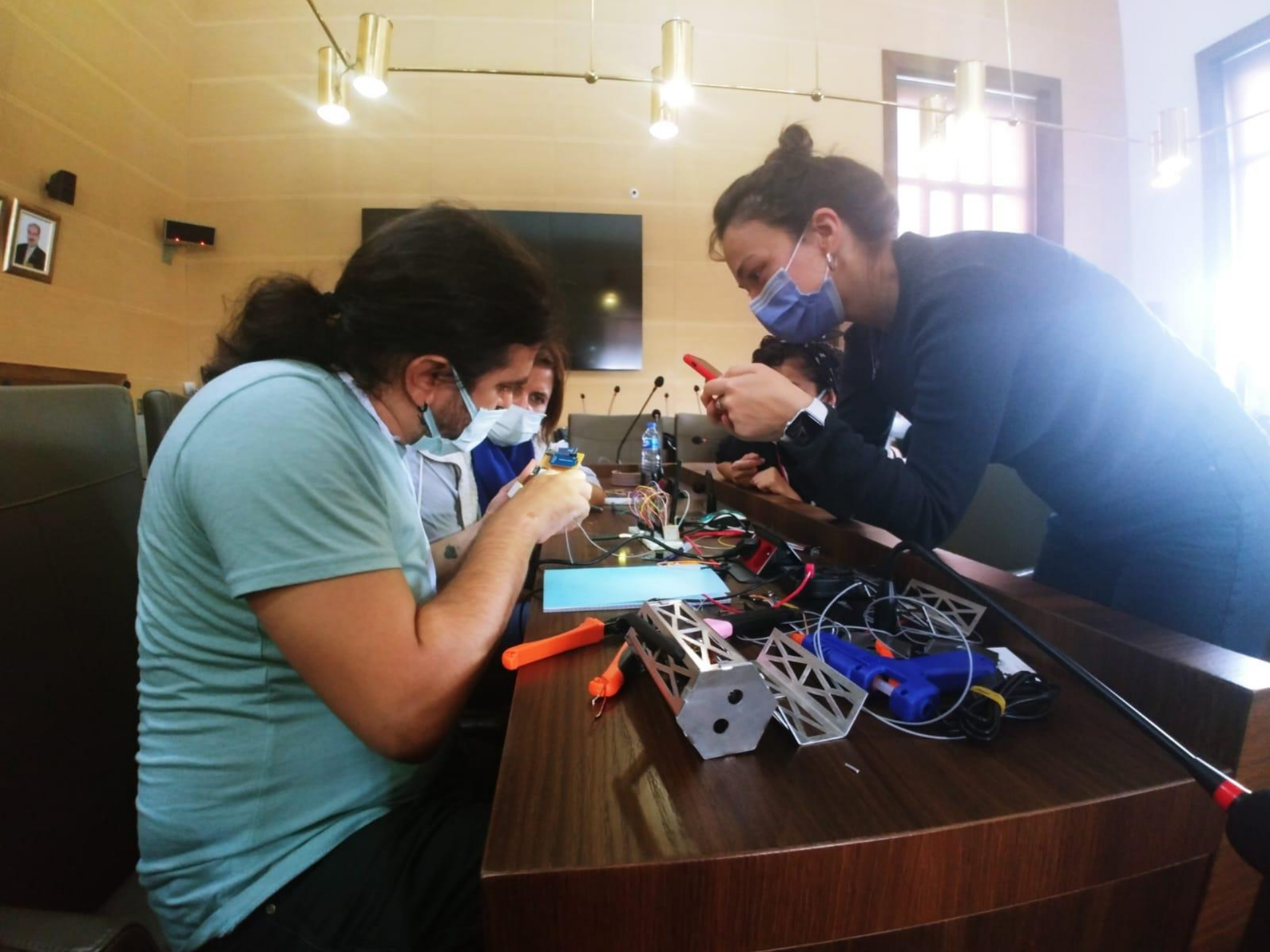




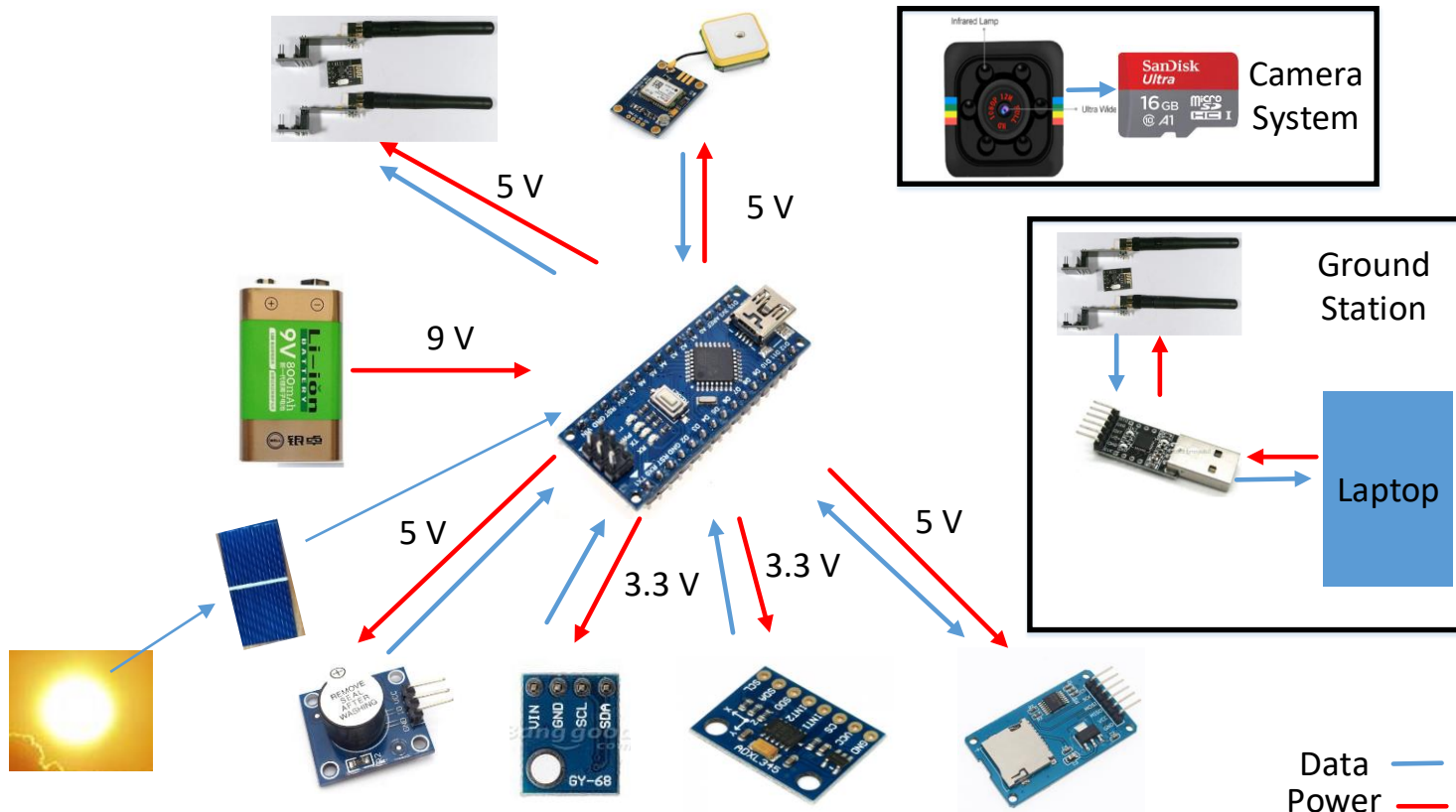










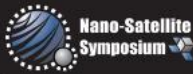


# The 11th Nano-Satellite Symposium

## The 8th UNISEC-Global Meeting

October 17-21, 2022

Istanbul Technical University, Istanbul, Türkiye



Oct. 17-18, 2022  
11th Nano-Satellite Symposium  
nanosat11th@itu.edu.tr



Oct. 19, 2022  
8th Mission Idea Contest  
spacemic.net



Oct. 20-21, 2022  
8th UNISEC-Global Meeting  
unisecc-global.org



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# We Look Forward To a Fruitful Cooperation

Towards being a civilization living  
in the Solar System

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