UNISEC-TURKIYE (UZTED) 2024 Activities

Prof.Dr. Alim Rustem Aslan, UZTED President, UNISEC Global PoC and StC Member
Manager-Founder, Space Systems Design and Test Laboratory
Istanbul Technical University, Faculty of Aeronautics and Astronautics,
Istanbul, Turkey
aslanr@itu.edu.tr

CHAPTERS

UNISEC GLOBAL
University Space Engineering Consortium

UNISEC TURKIYE
University Space Engineering Consortium

UNISEC EUROPE
University Space Engineering Consortium

Established as a legal society

23 Members from

13 Universities (7 Public + 6 Private)

G. Assembly 19.09.2021

18.01.2023

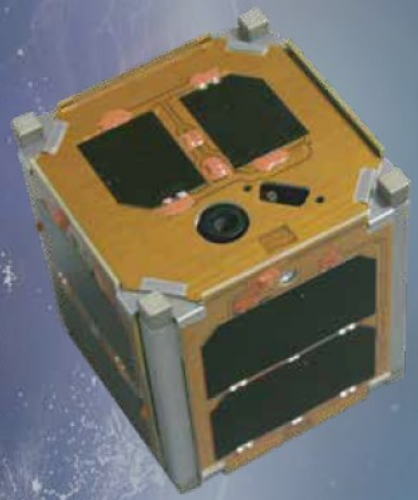
Some Activities Dec 2023-2024

- UZTED Meetings (22.01.2024 with UNISEC Japan)
- 13th NSAT and 9-10th UNISEC GLOBAL MEETING 2023-24
- Model Satellite training for regional students, Capacity Building
- Space talks to Secondary schools, Institutions (Space week)
- PreMIC9 (METU)
- SHARJAHSAT1 (launch Jan 2023) operations (S band GS placement)
- 3rd ICESCO Meeting and CanSat WS, August 2023 (Prof. Nakasuka KN)
- NLotusat Student 1U CubeSat Project
- PAUSAT1 Project
- TUA RAFS Project
- Kılıçsat Project
- Int CubeSat Meetings
- IAC2026 Antalya

LOW EARTH ORBIT AND
CUBESAT VISION

"small satellite"
"BIG TASK"

International *'Low Earth Orbit'* Cube and Small Satellite
conference and seminar



PROGRAM

14 December 2023 / 09:00 - 17:00
BTK Conference Hall / ANKARA


LOW EARTH ORBIT AND
CUBESAT VISION
"small satellite"
"BIG TASK"
International Low Earth Orbit Cube and Small Satellite
conference and seminar
TUYAD
TELECOMMUNICATION SATELLITE AND ELECTRONIC INDUSTRIALISTS BUSINESS PEOPLE ASSOCIATION
Conference Speaker
Prof. Shinichi
Nakasuka
University of Tokyo
"Space Commercialization and Cubesat's at LEO"
14 December 2023
BTK Conference Hall / ANKARA
Keynote Speaker
Qstc
isnet
TURKSAT
BİLGİ TEKNOLOJİLERİ VE İLETİŞİM KURUMU
DİJİTAL YAŞAM
HEDEF ELEKTRONİK

İSTANBUL BAROSU HAVACILIK ve UZAY HUKUKU KOMİSYONU

9 MART 2024, Saat: 11:00

İSTANBUL BAROSU KÜLTÜR MERKEZİ

11:00 Açılış Konuşması

Avukat Nazlı Can
Havacılık ve Uzay Hukuku Komisyonu Sözcüsü

I. OTURUM

Moderatör :

Avukat Ahmet Sadık Hıdır
Havacılık ve Uzay Hukuku Komisyonu Sekreteri

11:10 – 11:40 :

Uzaktan Algılama Sistemleri ve Regolitlerin Yerinden İncelemesi

Avukat Egemen Demirer
Havacılık ve Uzay Hukuku Komisyonu Üyesi

11:40-12:10 :

Uzay Şirketlerinin Gelişim Süreci

Avukat Sinan İçin
Havacılık ve Uzay Hukuku Komisyonu Üyesi

12:10-12:40:

Ay Kolonileri İnşasında İnsan ve Teknoloji Bütünlüğü

Prof. Dr. Birol Çotuk
Marmara Üniversitesi

12:40 - 13:00 : Ara

II. OTURUM :

Moderatör :

Avukat Ahmet Sadık Hıdır
Havacılık ve Uzay Hukuku Komisyonu Sekreteri

13:00-13:30:

Türkiye ve Dünya da Uzay Teknolojilerinde Son Gelişmeler

Prof. Dr. Rüstem Aslan
İstanbul Teknik Üniversitesi / Uzay Teknolojileri ve Eğitimi Derneği

13:30-14:00 :

Ay Projelerinin Uzay Hukukundaki Yeri

Avukat Nazlı Can
Havacılık ve Uzay Hukuku Komisyonu Sözcüsü


STC 2024
CENTRAL EURASIA
SPACE TECHNOLOGY CONFERENCE
24-26 APRIL 2024
ANKARA, TÜRKİYE
UZBEKISTAN
National Space Agency
UZBEKKOSMOS
azercosmos
AZERBAIJAN
National Space Agency
AZERCOSMOS
KAZAKHSTAN
Ministry of Digital Development, Innovations & Aerospace
SUPARCO
PAKISTAN
National Space Agency
CHINA
National Space Administration
وكالة الإمارات للفضاء
UAE SPACE AGENCY
UAE
National Space Agency
SENEGAL
The Space Studies Agency
ITU
International Telecommunication Union
TÜRKİYE
Organisation of Turkic States
APSCO
Asia-Pacific Space Cooperation Organization
09:00
PLENARY MISSION 1: Development of Central Eurasia's space ecosystem and the opportunities for international collaboration
INTRODUCTION
JULIA ROMANENKO
DIALOGUE
WELCOME ADDRESS
MEHMET FATIH KACIR
MODERATOR
PROF. DR. BURAK BERK ÜSTÜNDAĞ
SPEAKERS
YUSUF KIRAÇ
SHUKHRAT KADIROV
KAIYRZHAN KOZHAYEV
MEHMET NEFES
H.E SALEM BUTTI SALEM AL QUBAISI
SAMADDIN ASADOV
MOHAMMAD YOUSUF KHAN
HASAN HÜSEYİN ERTOK
SPONSORED BY
TÜRKSAT
MAXAR
planet
Synspective
DIALOGUE
TUA
Turkish Space Agency


TJU
TÜRK - JAPON BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ
TURKISH - JAPANESE SCIENCE AND TECHNOLOGY UNIVERSITY
トルコ・日本科学技術大学

TUA VISIT

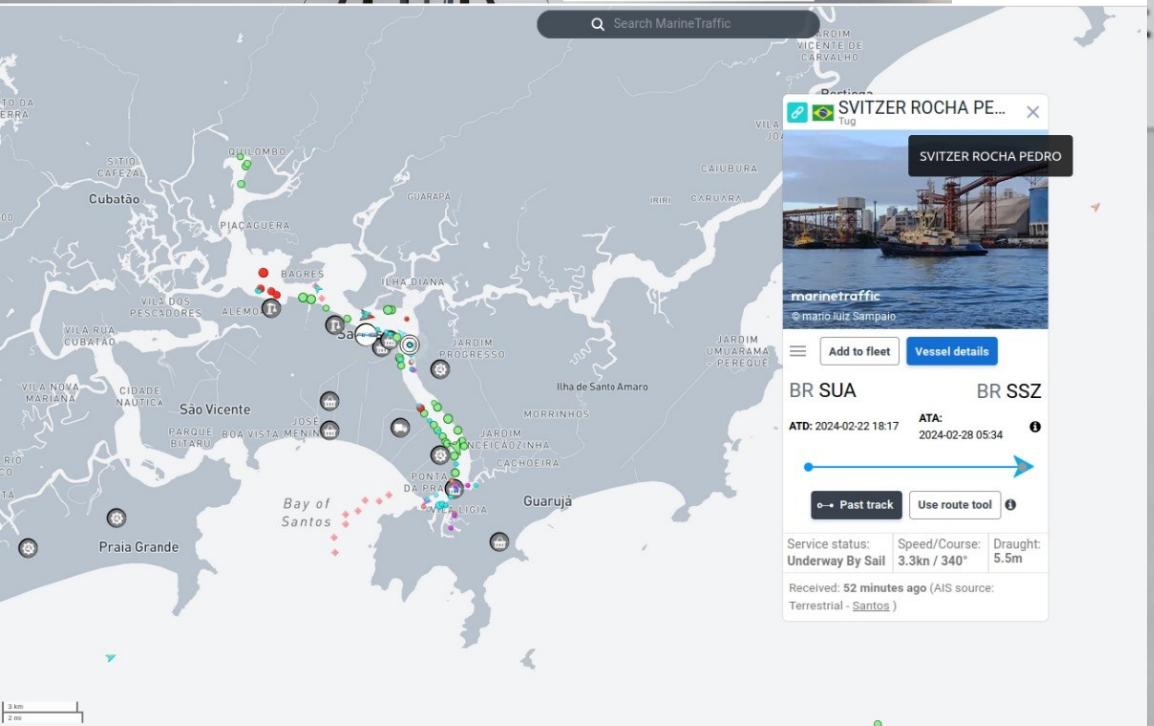

AYRICALIKLI BİR DEVLET ÜNİVERSİTESİ
Türk-Alman İş birliği
Çok Dillilik
Üst Düzey Eğitim
Seçkin Akademik Kadro
Burslu Yaz Kursları
Prestijli Staj Avantajları
Uluslararası Kariyer


TÜRKSAT 6A
ÜLKEMİZİN İLK MİLLİ ve YERLİ HABERLEŞME UYDUSU
TÜRKSAT
UZAY
TÜRKHAVACILIK UZAYSANAYİİ
aselsan

SpaceEXPO Bremen 19-20 Nov 2024


AIRBUS
arianeGroup
AIRBUS
SPACELAB

THK UNIVERSITY ANKARA



METU Aerospace Engineering Department

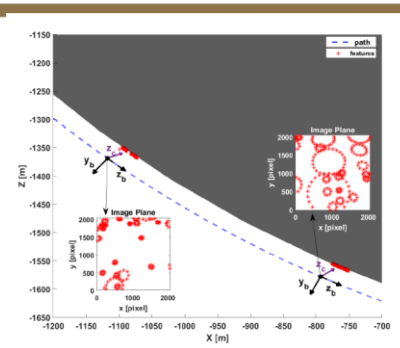
- Founded in 1981 (as aeronautical eng)
- More than 600 students (BS + MS + PhD)
- Fully Accredited by ABET
- Space related undergraduate courses
  - Introduction to Aerospace Engineering (1st year)
  - Space Vehicle Design (4th year)
  - Spacecraft Dynamics (4th year)
  - Introduction to Rocket Technology (4th year)
  - Inertial Navigation Systems (4th year)
  - Introduction to Space Sciences (Graduate)
  - Applied Orbital Mechanics (Graduate)
- Close collaboration with the Aerospace Companies and also the research institutes in Ankara.
  - Candidate Engineering for 4th year undergrad students.
  - Summer training programs

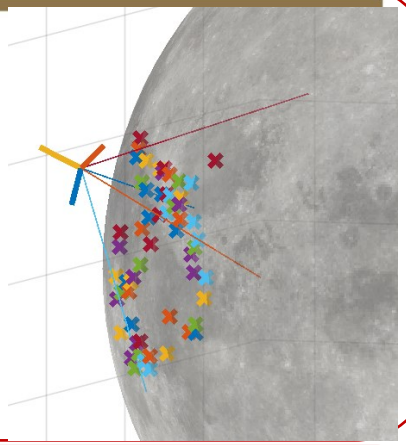
METU | FACULTY OF ENGINEERING
AEROSPACE ENGINEERING DEPARTMENT

METU

Present Activities

- METU Autonomous Space Vehicles Lab
  - Forming our own lab.
  - Working in collaboration with other departments such as METU EE.
- Students taking part in activities by
  - TUBITAK Space (Lunar program)
  - Private companies (Plan-S, Hello Space)
- APSCO Cubesat Projects
  - An engineering model for a 3U cubesat for disaster monitoring (METUCube) is currently being developed.
  - A joint cubesat constellation project is under preparation.
- International / national research projects
  - Space situational awareness
  - Fault tolerant ADCS design and development
  - Visual navigation algorithms for interplanetary missions
- Outreach activities
  - Space workshop for junior high school students
  - Science talks





Research outcomes for visual navigation aid for a lunar lander

Students contributed to the development of pocketqube satellites by Hello Space

Kids designing their cubesat missions and preparing paper mock-ups

ITU, Astronautical Engineering

- Establishment 1983 (ITU 1773)
- 50 new ug students per year + Graduate students
- Space related labs
  - Spacecraft Systems Design and Testing
  - Small Satellite communication
- Aim:
  - Research and testing on space systems and components
  - To have engineers with laboratory experience to serve the (inter)national aerospace industry

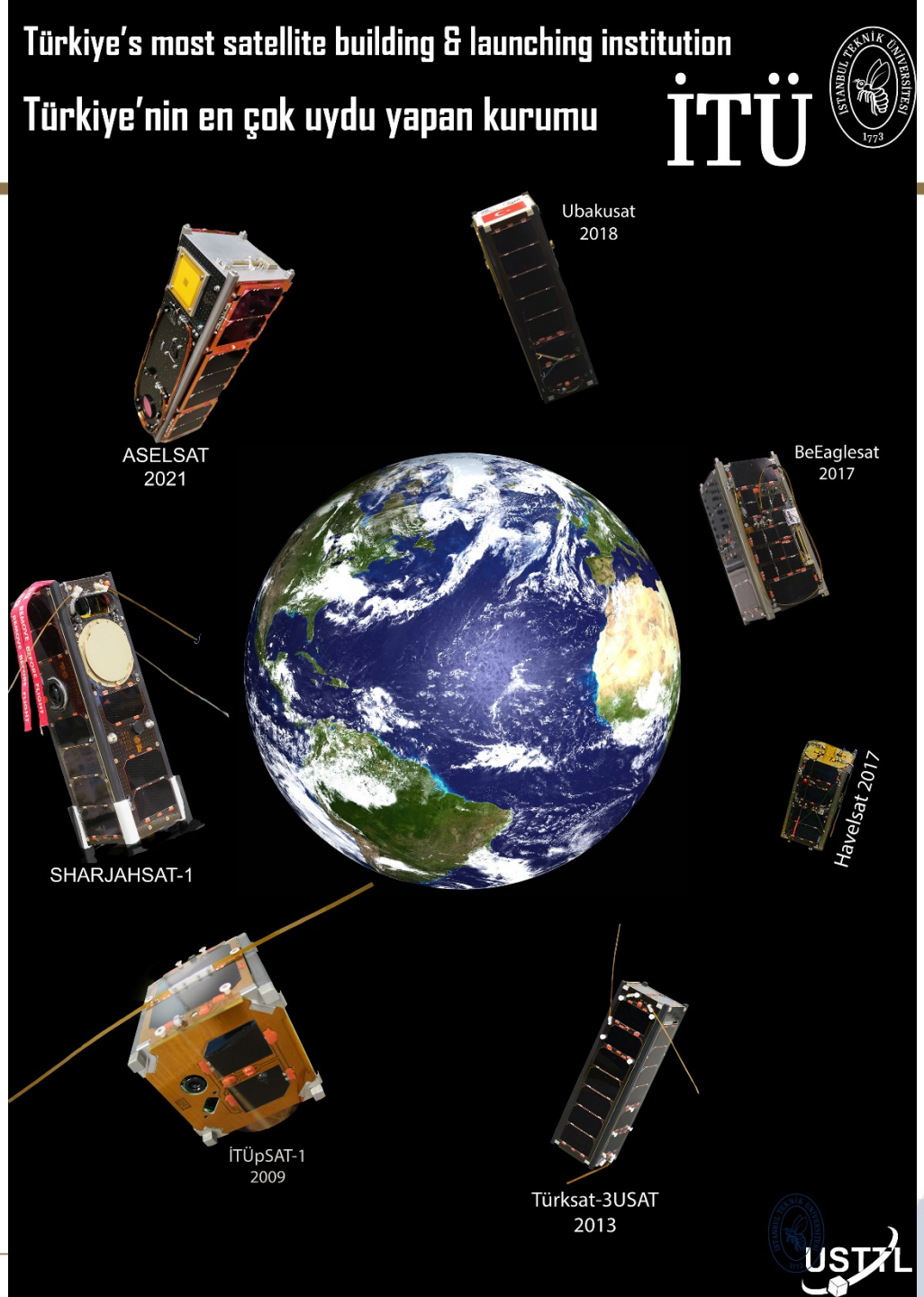
Astronautical Engineering Curriculum

- Education in space science and Technologies, 2 Space labs, 50 students/year
- Follows AIAA recomendations
- Fully Accredited by ABET till 2030
- Space related undergraduate courses (+ graduate program with advanced topics)
  - Intro. to Astronautical Engineering&Design (CanSat Application) (1st year)
  - Aerospace Materials and Structures (2nd year)
  - Orbital Mechanics, (3rd year)
  - Space environment, (3rd year)
  - Spacecraft Attitude Determination and Control (3rd)
  - Spacecraft communications (3rd)
  - Rocket and Electric Propulsion (4th)
  - Spacecraft system design with application (SSDI-II) (4th)
- Electives:
  - Basic Astronomy, Space Law, Applic.of Satellite-Based Data

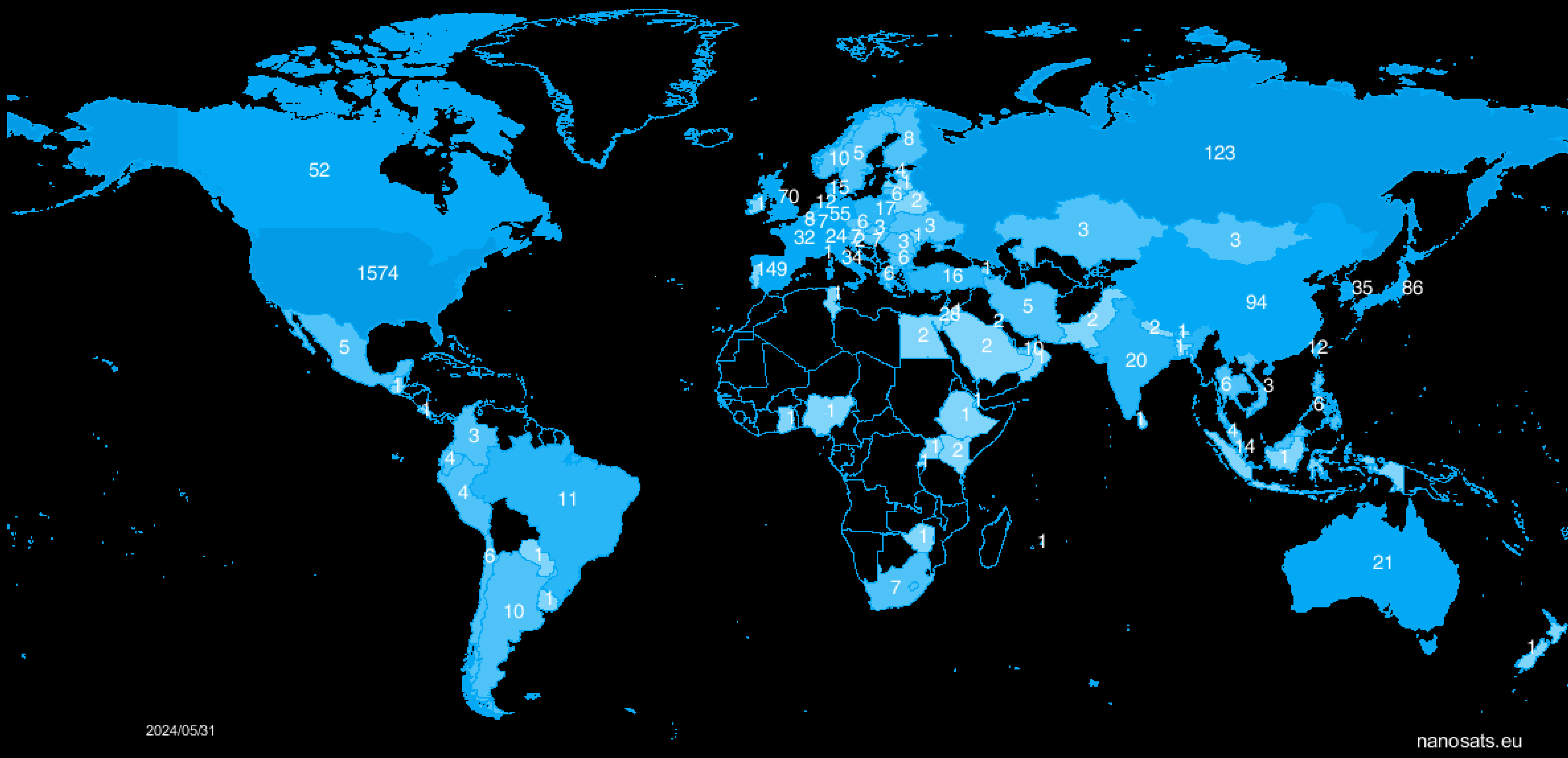
İTÜ-SSDTL
Space Systems Design and Test Lab

İTÜ-SSDTL CUBESAT PROJECTS

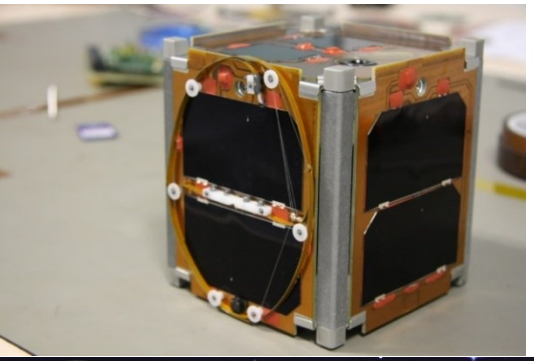
ITU-SSDTL has completed 7 CubeSats in the lab (all launched) , and supported many others into orbit.

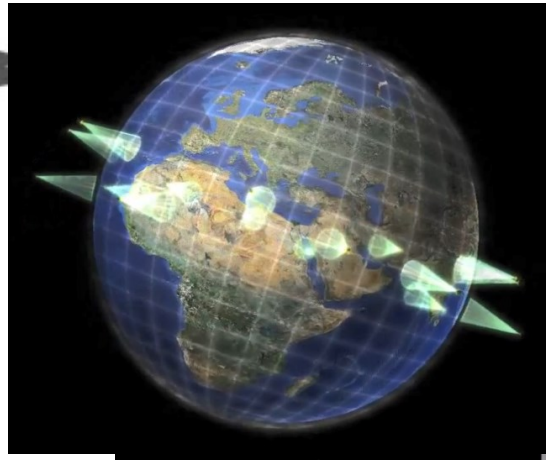


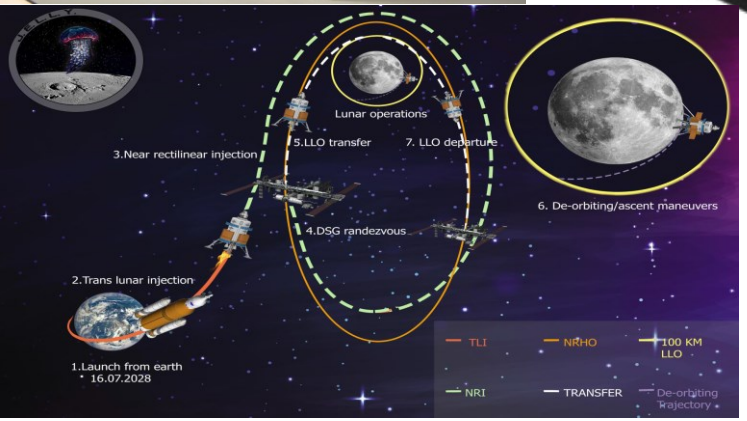
Launched nanosatellites



Small Satellite Constellations for various Applications
FUTURE OF CUBESATS







Prof.Dr. Alim Rustem Aslan
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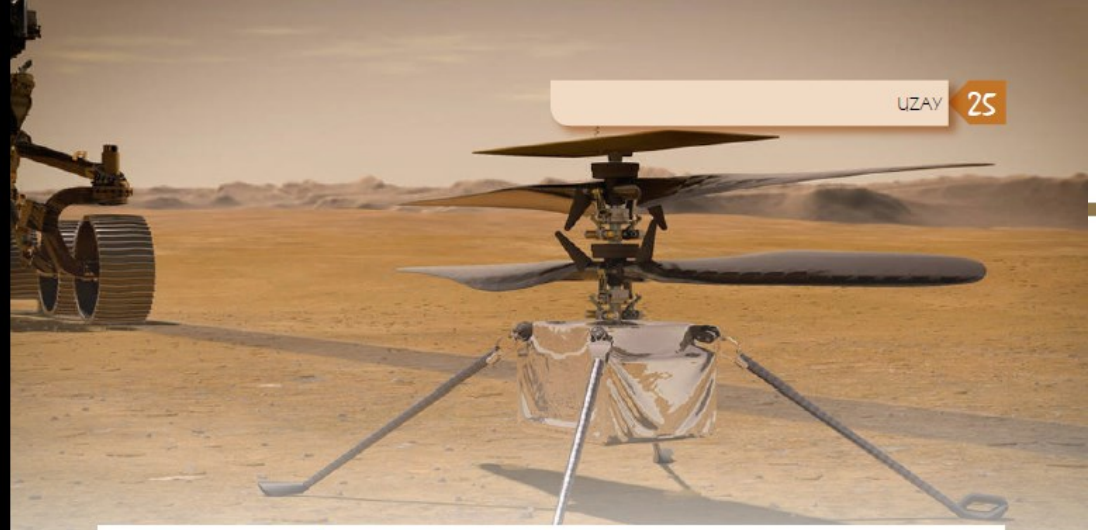


MARS HELİKOPTER TASARIMI

Zeynep Sevgi Savaş[1], Prof. Dr. Alim Rüstem Aslan[2]

1. GİRİŞ

Uzay araştırmalarının büyük önem kazandığı günümüz dünyasında, bu araştırmalarda Mars'ta keşif çalışmaları da önemli bir yer tutmaktadır. Mars, Güneş sisteminin erken tarihini ve küçük gezegenlerin zaman içinde nasıl evrimleştiğini anlamak için ideal bir gezegendir. Mars'ta veya herhangi bir Dünya dışı cisimde geçmiş veya şimdiki yaşamın kanıtı henüz bulunamamıştır ve bu temel soru, keşif görevlerini asıl motive eden şeydir [1].

Başlangıçta Mars, uydular ve yörüngeler kullanılarak uzaktan incelenmiştir. Daha sonra araştırmalar ve çalışmalar bir adım daha ileri götürülmüştür ve gezegen sabit yüzey aracı kullanılarak yüzeyden incelenmeye başlanmıştır. Ancak sabit yüzey araçları düşünüldüğünde, hareketsiz oldukları için işlevlerinin sınırlı olduğu söylenebilir. Daha sonra geliştirilen gezici teknolojisi, Mars yüzeyinde daha ayrıntılı bir araştırma fırsatı sağlamıştır. Geziciler hem yüzeyde olup hem de hareket edebildikleri için daha detaylı keşifler yapabiliyorlar. Mars araştırmalarına yönelik bir adım ötede neler olacağı düşünülürse, şu anda hayata geçirilen helikopter teknolojisinin bu olduğu söylenebilir. Mars'ta uçacak bir araç, araştırmalara farklı bir bakış açısı sağlayabilir. Böyle bir araç, yüzeyi yukarıdan gözlemleyebilir, daha geniş bir mesafeyi inceleyebilir ve uçabildiği için büyük engellerin üstesinden rahatlıkla gelebilir.

Mars'ta uçacak bir helikopter tasarlamak için öncelikle Dünya'da uçan helikopterlerin teknolojisini iyi anlamak gerekiyor. Helikopterlerin genel mekanizması basitçe incelenecek olursa, helikopter, pal adı verilen kanatlarla uçan bir uçaktır. Rotor sistemine sahiptir. Kanatlar, helikopter motorunun gücü altında dönerek bir hava akımı ve bu hava akımı sonucunda bir itki oluşturur. Ortaya çıkan itme kuvveti helikopterin ağırlığını aştığında helikopter kalkış durumuna geçer. Helikopterin ileri uçabilmesi için rotor tarafından tutulan kanat gövdesi belli bir açıyla eğilir ve ileriye doğru bir itme meydana gelir ve bunun sonucunda helikopter ileri doğru hareket etmeye başlar. Pek çok helikopter çeşidi ve her çeşidin kullanıldığı farklı alanlar bulunmaktadır. Her helikopterin belirli avantajları ve dezavantajları vardır. Bazı helikopterlerin taşıma kapasitesi yüksektir ve daha fazla kargo veya yolcu taşıyabilir. Bazı helikopterlerin taşıma kapasitesi

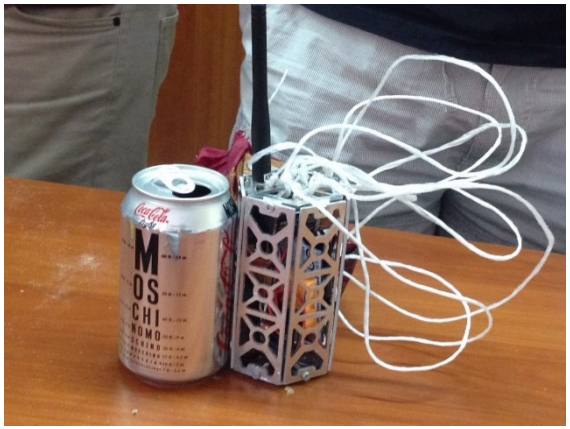
[1] Öğrenci, Uzay Mühendisliği Bölümü, İstanbul Teknik Üniversitesi - savazz16@itu.edu.tr
[2] Öğretim üyesi, Uzay Mühendisliği Bölümü, İstanbul Teknik Üniversitesi - aslanr@itu.edu.tr

Astronautical Engineering and Design

CANSAT(MODEL SATELLITE) DESIGN and TRAINING

2023/2024 SPRING

CanSat – Model Satellite
Intro to CanSat, Mission Definition and Sensors



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Istanbul, Turkey
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AIAA DEEP SPACE PROJECTS for SSD COURSE

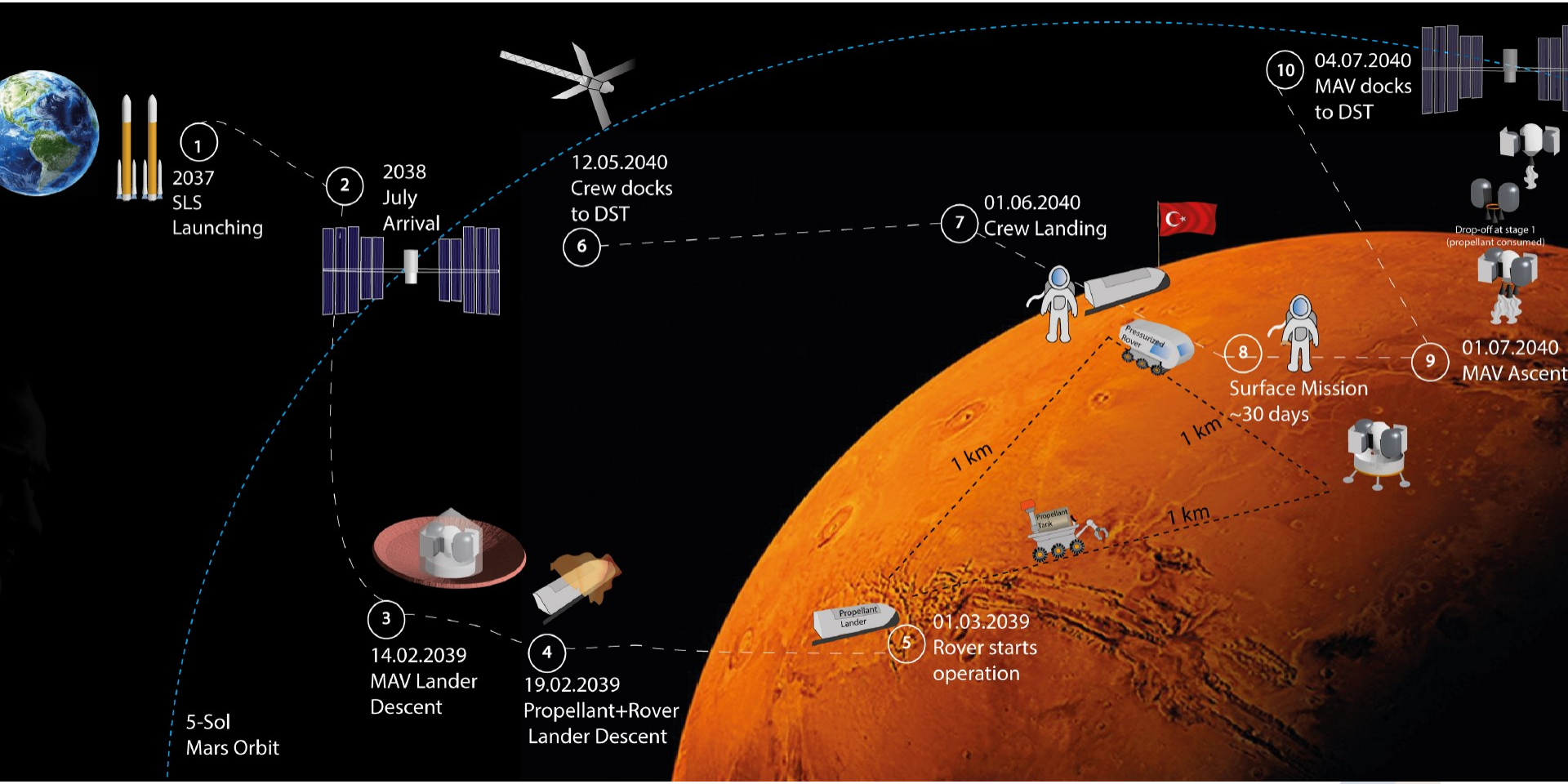
2021-2022 Project
Manned Mission to Martian Moons

2022-2023 Project

MARS DUAL ASCENT VEHICLE

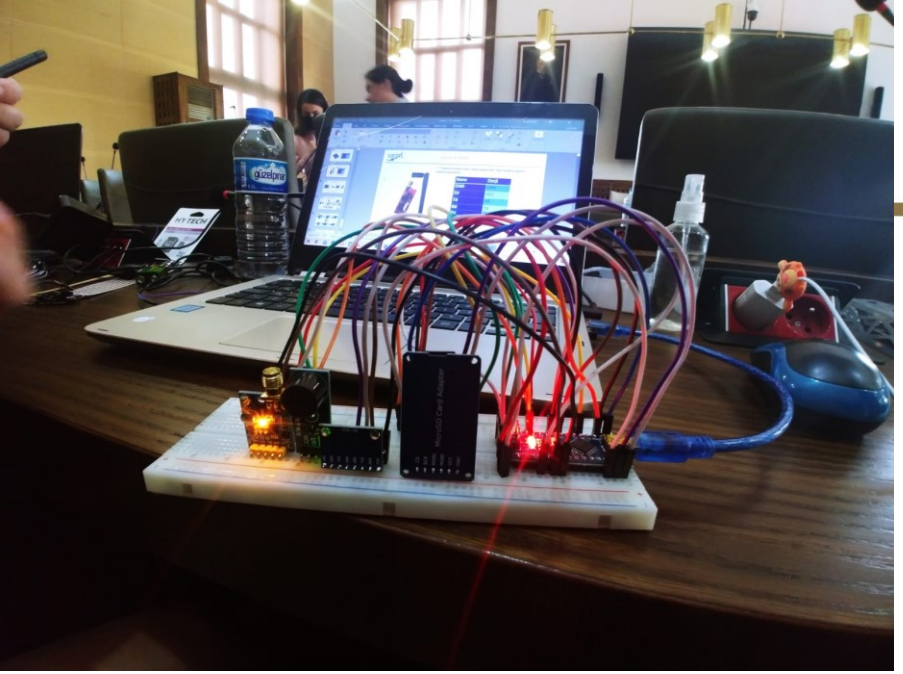
2023-2024 Project

Human Enabled Venus Robotic Exploration (AIAA 3rd Place)


1
2037
SLS
Launching
2
2038
July
Arrival
12.05.2040
Crew docks
to DST
6
7
01.06.2040
Crew Landing
10
04.07.2040
MAV docks
to DST
Drop-off at stage 1
(propellant consumed)
Pressurized
Rover
8
Surface Mission
~30 days
9
01.07.2040
MAV Ascent
1 km
1 km
1 km
Propellant
Tank
Propellant
Lander
5
01.03.2039
Rover starts
operation
3
14.02.2039
MAV Lander
Descent
4
19.02.2039
Propellant+Rover
Lander Descent
5-Sol
Mars Orbit

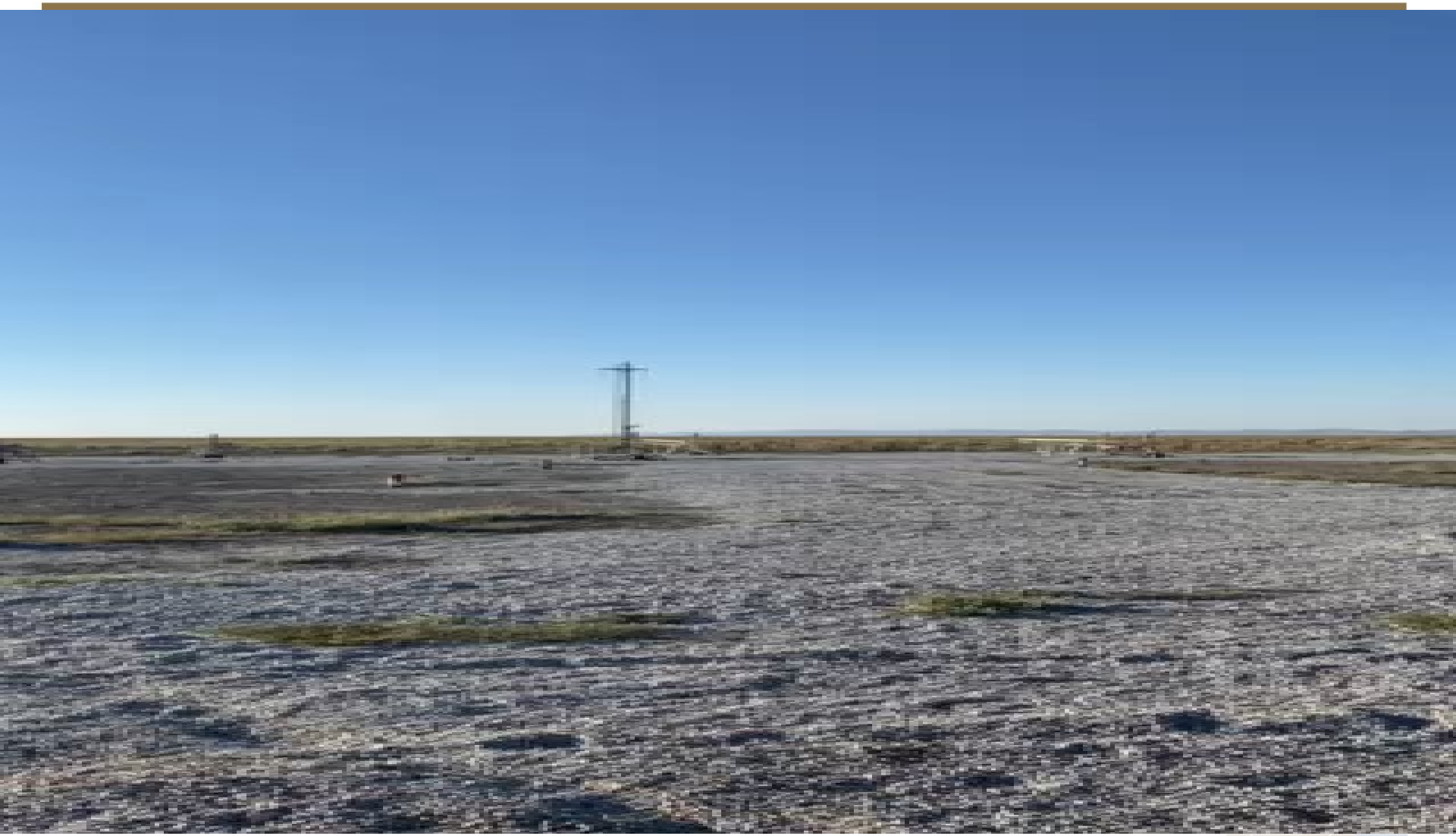
CANSAT/CUBESAT HANDS ON WORKSHOPS

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




ايسيسكو
ICESCO
ICESCO'S 3rd
INTERNATIONAL MODEL
SATELLITE (CanSat)
WORKSHOP & AEROSPACE
SYMPOSIUM
"Building Tomorrow's
Global Workforce"
31st July 2023 - 5th August 2023
Istanbul & Aksaray, Turkey
İTÜ
azercosmos
GUHEM
roketsan


NOVERT



TEKNOFEST


5TH YEAR
MODEL SATELLITE COMPETITION
ROCKET COMPETITION
HELICOPTER DESIGN COMPETITION
FLYING CAR COMPETITION
ENVIRONMENT AND ENERGY TECHNOLOGIES COMPETITION
JET ENGINE DESIGN COMPETITION
TEKNOFEST
AEROSPACE AND TECHNOLOGY FESTIVAL
UNMANNED AERIAL VEHICLE COMPETITION
#MİLLİ TEKNOLOJİ HAMLESİ
SWARM ROBOTS COMPETITION
HETEROGENEOUS SWARM SIMULATION COMPETITION
TECHNOLOGY FOR HUMANITY COMPETITION
AGRICULTURAL TECHNOLOGIES COMPETITION
FIGHTER UAV COMPETITION
EDUCATIONAL TECHNOLOGIES COMPETITION
BIOTECHNOLOGY INNOVATION COMPETITION
COME AND JOIN US IN THE WORLD'S BIGGEST TECHNOLOGY COMPETITIONS
EFFICIENCY CHALLENGE ELECTRIC VEHICLE COMPETITION
ROBOTAXI FULLSCALE AUTONOMOUS VEHICLE COMPETITION COMPETITION
SMART TRANSPORTATION COMPETITION
UNMANNED UNDERWATER SYSTEMS COMPETITION
ARTIFICIAL INTELLIGENCE IN HEALTHCARE COMPETITION
HIGH SCHOOL STUDENTS POLAR RESEARCH PROJECTS COMPETITION
AGRICULTURAL UNMANNED LAND VEHICLE COMPETITION
TURKEY DRONE CHAMPIONSHIP
WORLD DRONE CUP
TRAVEL HACKATHON
DIGITAL TECHNOLOGIES COMPETITION IN INDUSTRY
ARTIFICIAL INTELLIGENCE IN TRANSPORTATION COMPETITION
HACK BLACK SEA
> 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
TURKISH TECHNOLOGY TEAM
REPUBLIC OF TURKEY MINISTRY OF INDUSTRY AND TECHNOLOGY
FOR APPLICATION teknofest.org teknofesteng
APPLICATION DEADLINE FEBRUARY 28'22

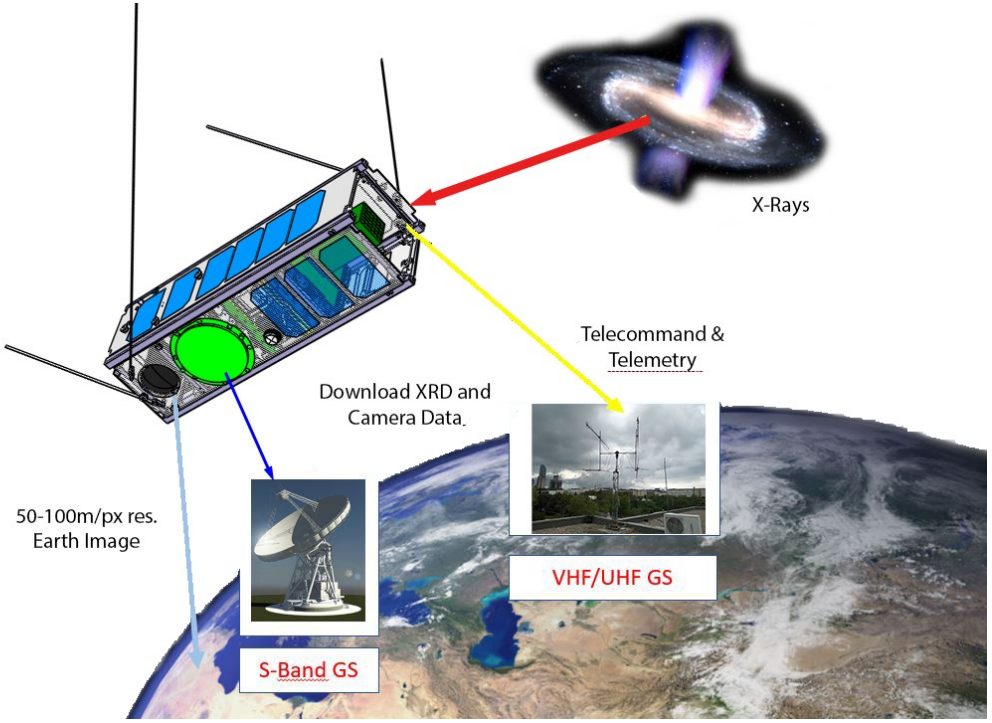
SHARJAHSAT-1 MISSION

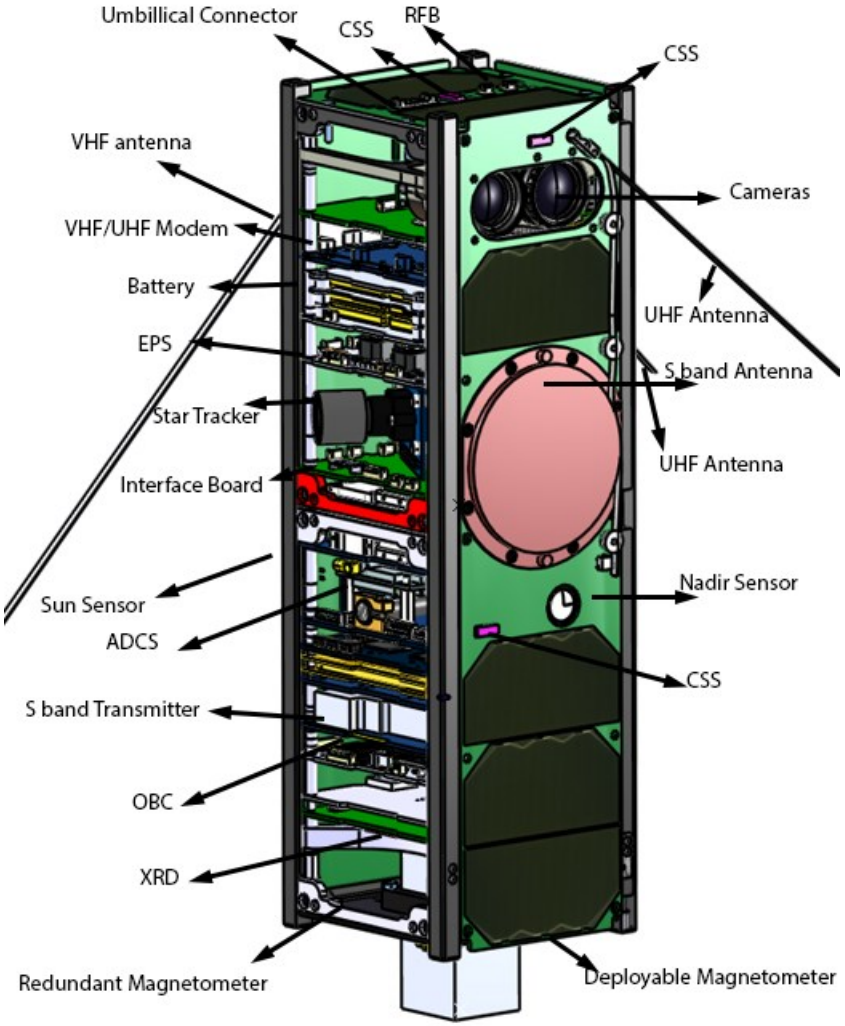
- UNIVERSITY of SHARJAH, UAE
- Istanbul Technical University
- Sabancı University

- Capacity development through
  - Science mission: star detection and sun observation
  - Imaging mission: earth and space
- Payload
  - X Ray detector
  - Optical camera

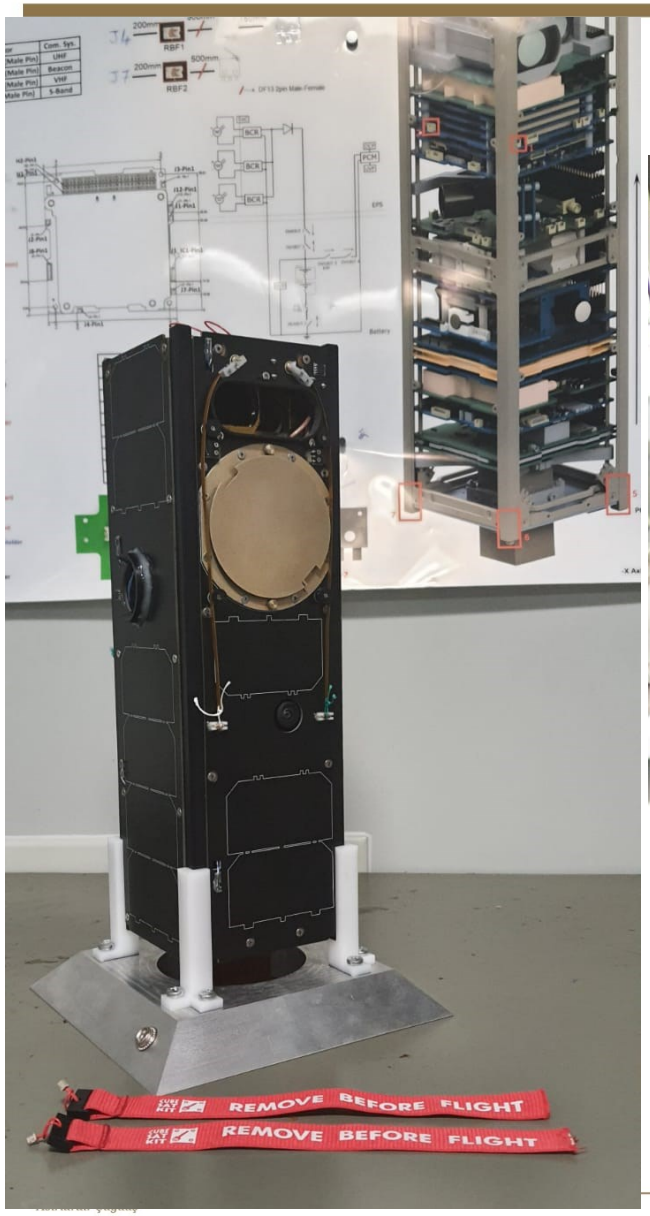
- Launched 3 January 2023

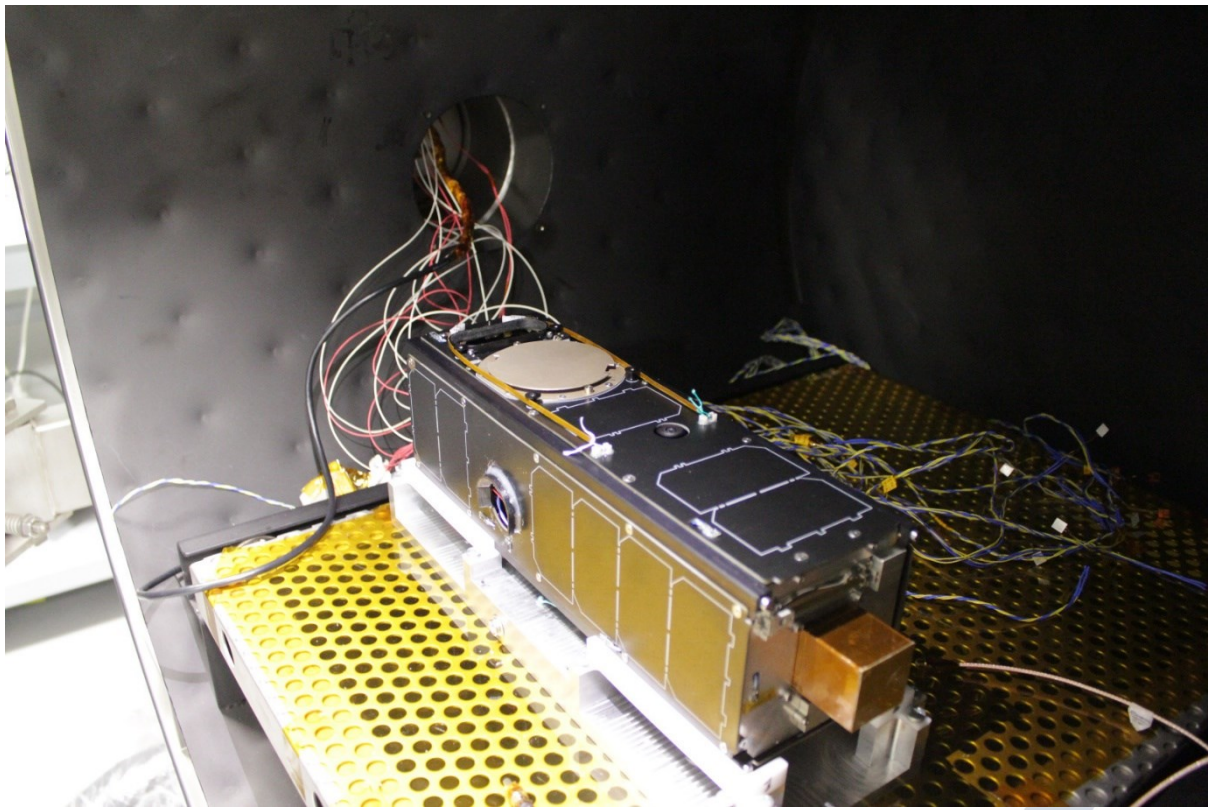
SHARJAH SAT -1






samtec


REMOVE BEFORE FLIGHT
REMOVE BEFORE FLIGHT

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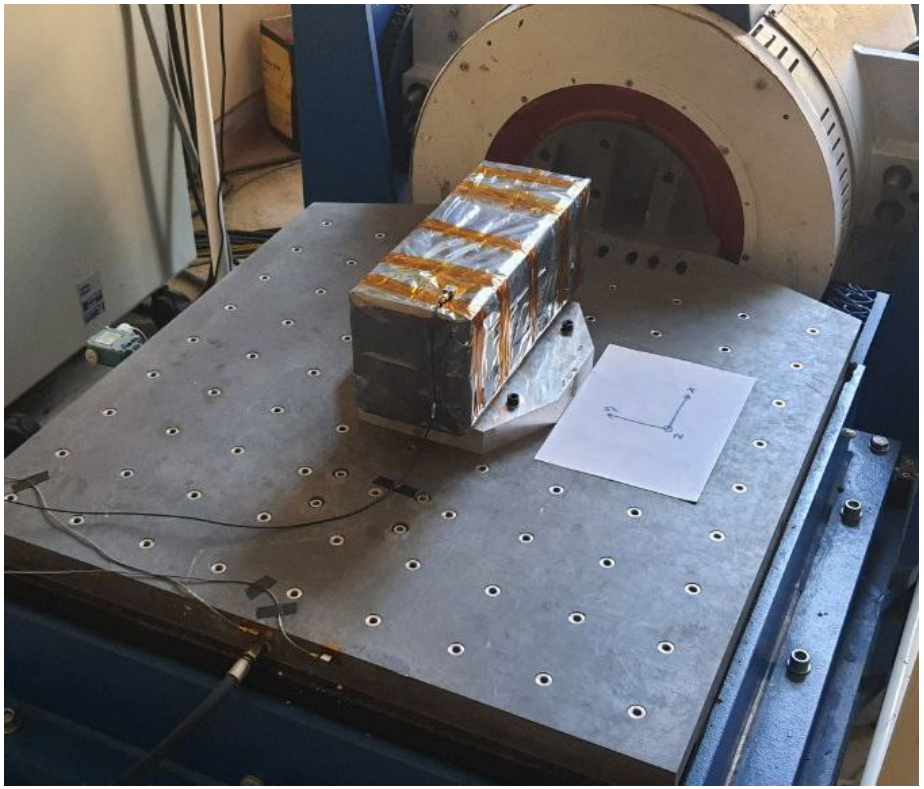
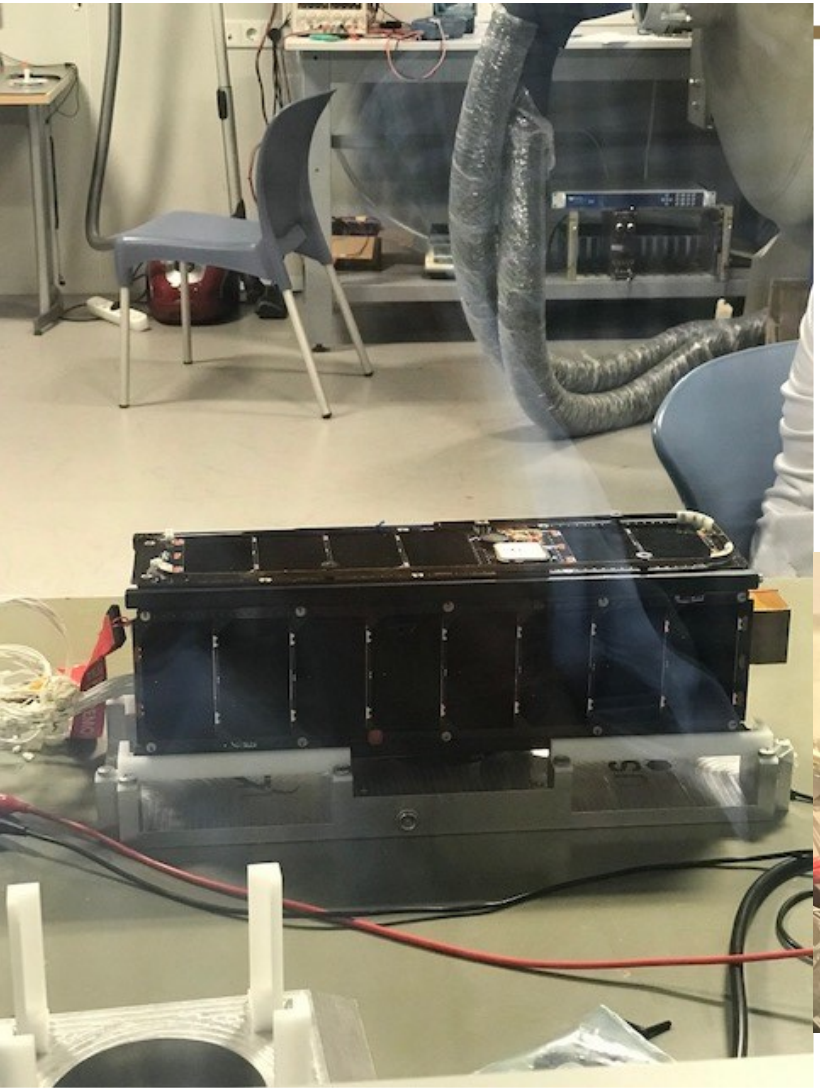
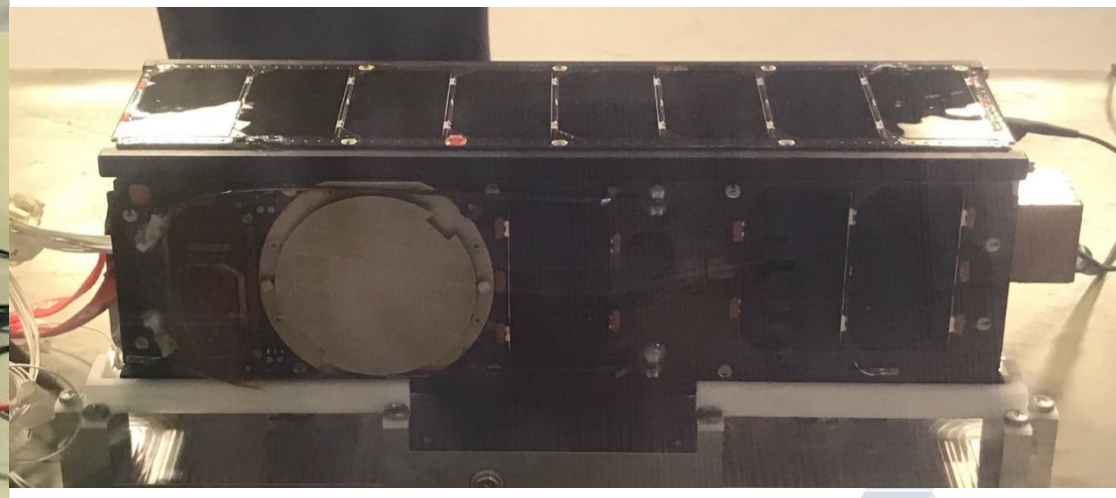
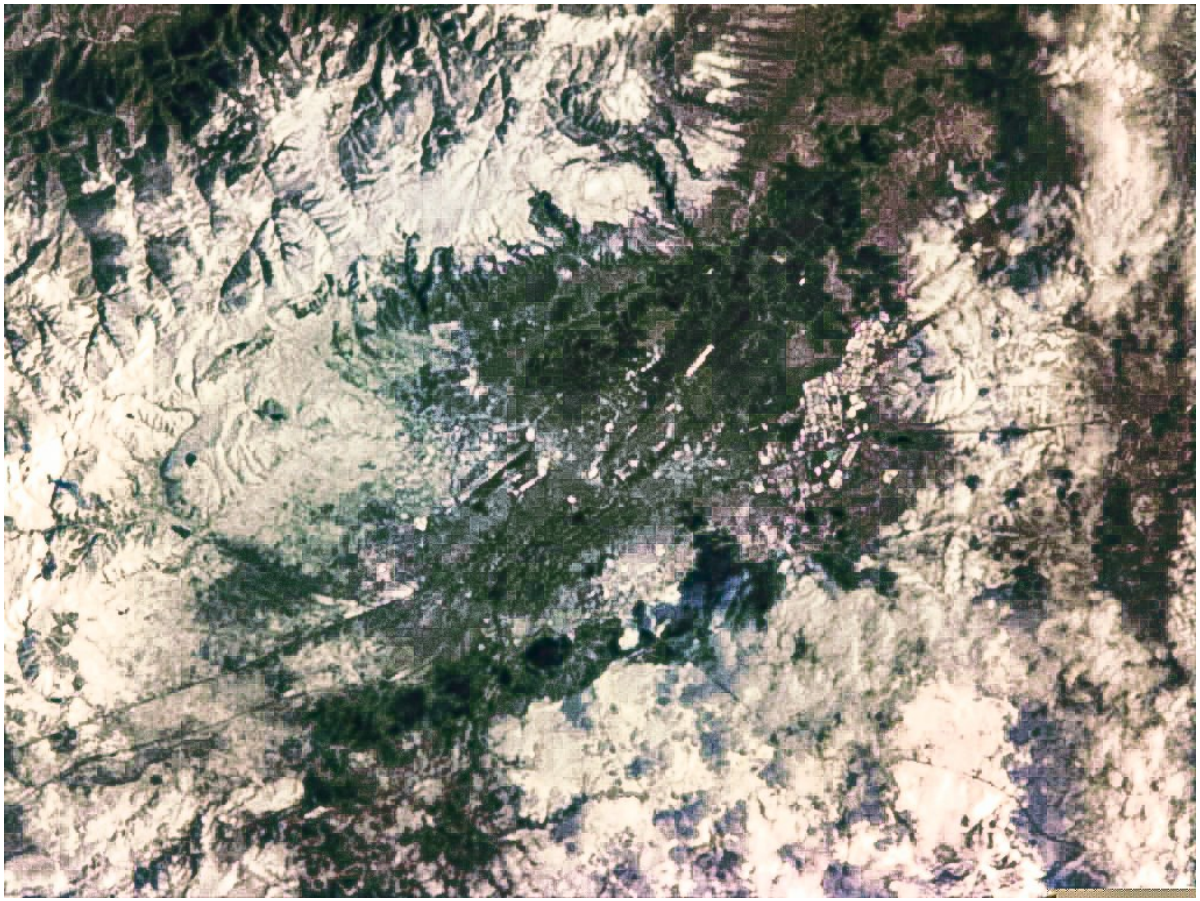
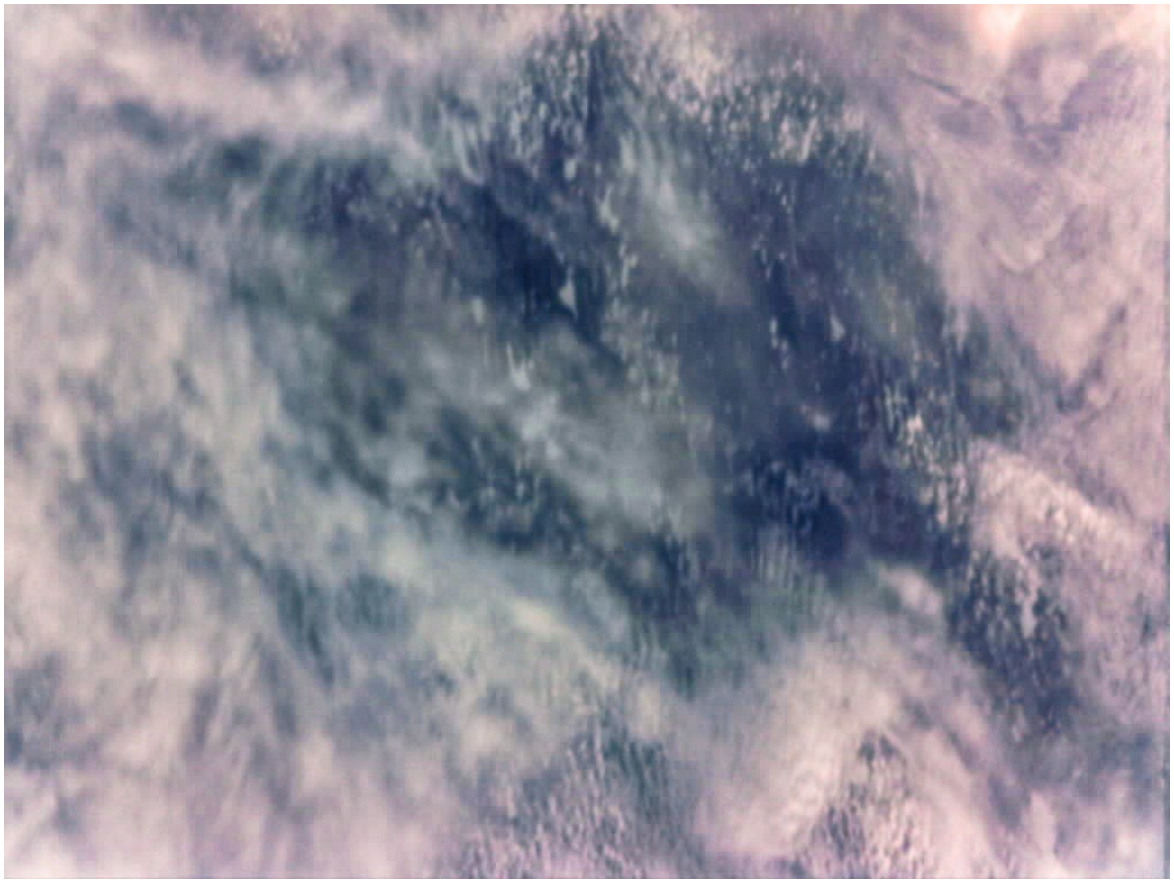


SHARJAHSAT-1 Before Flight



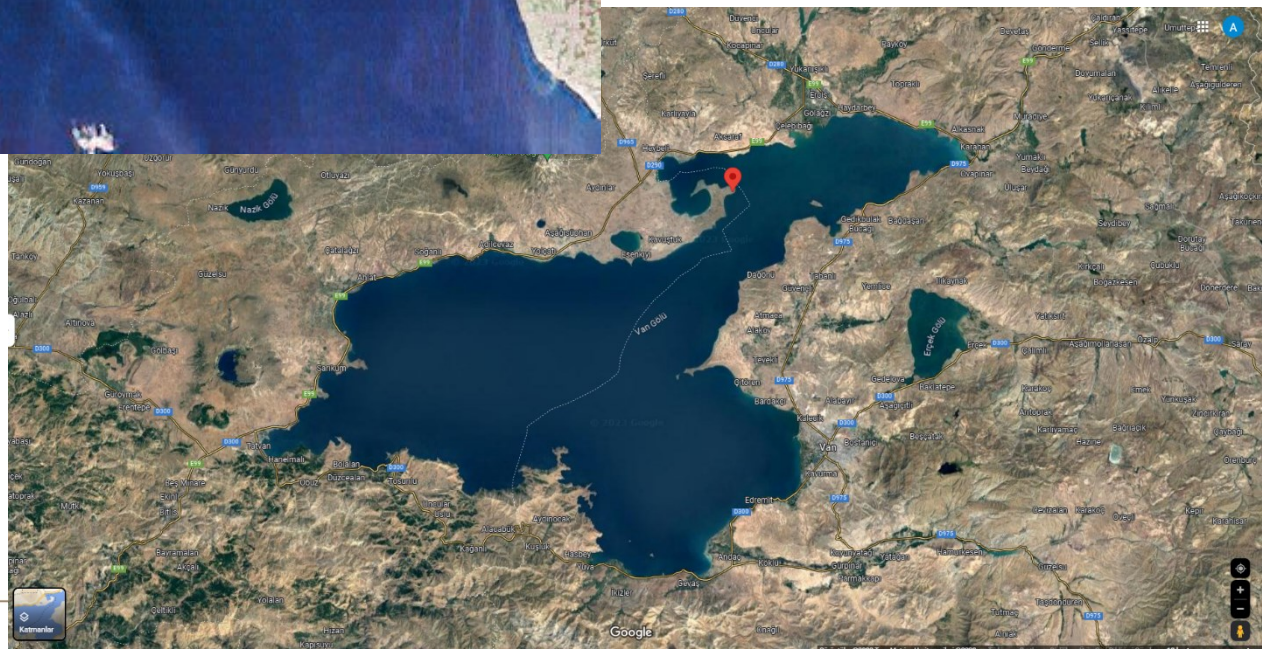




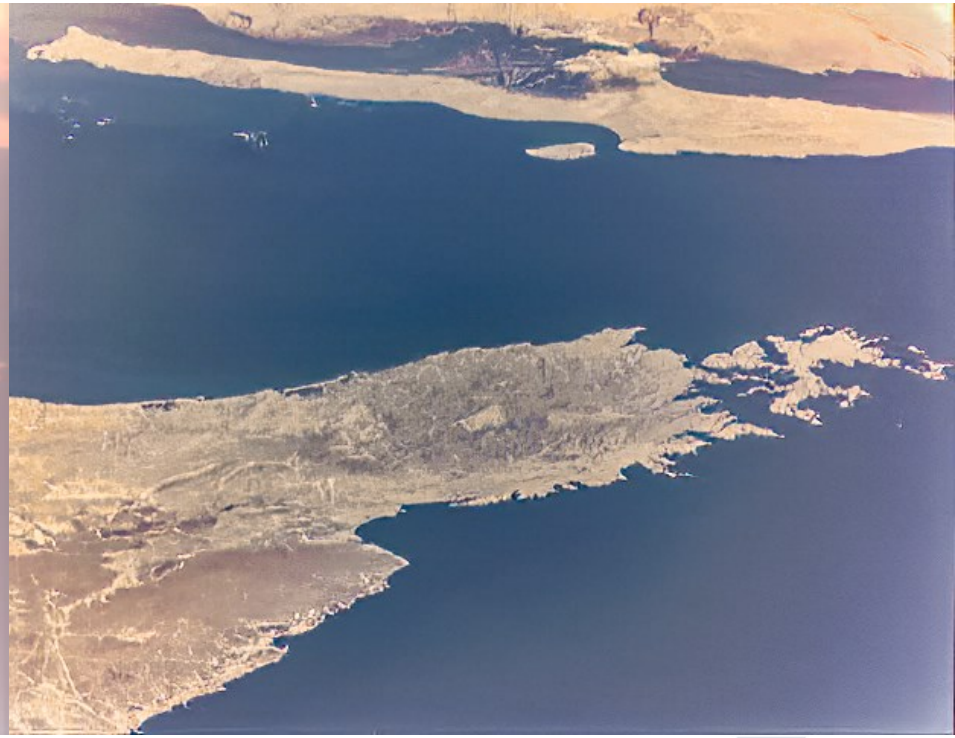


İTÜ

VAN LAKE
TURKİYE

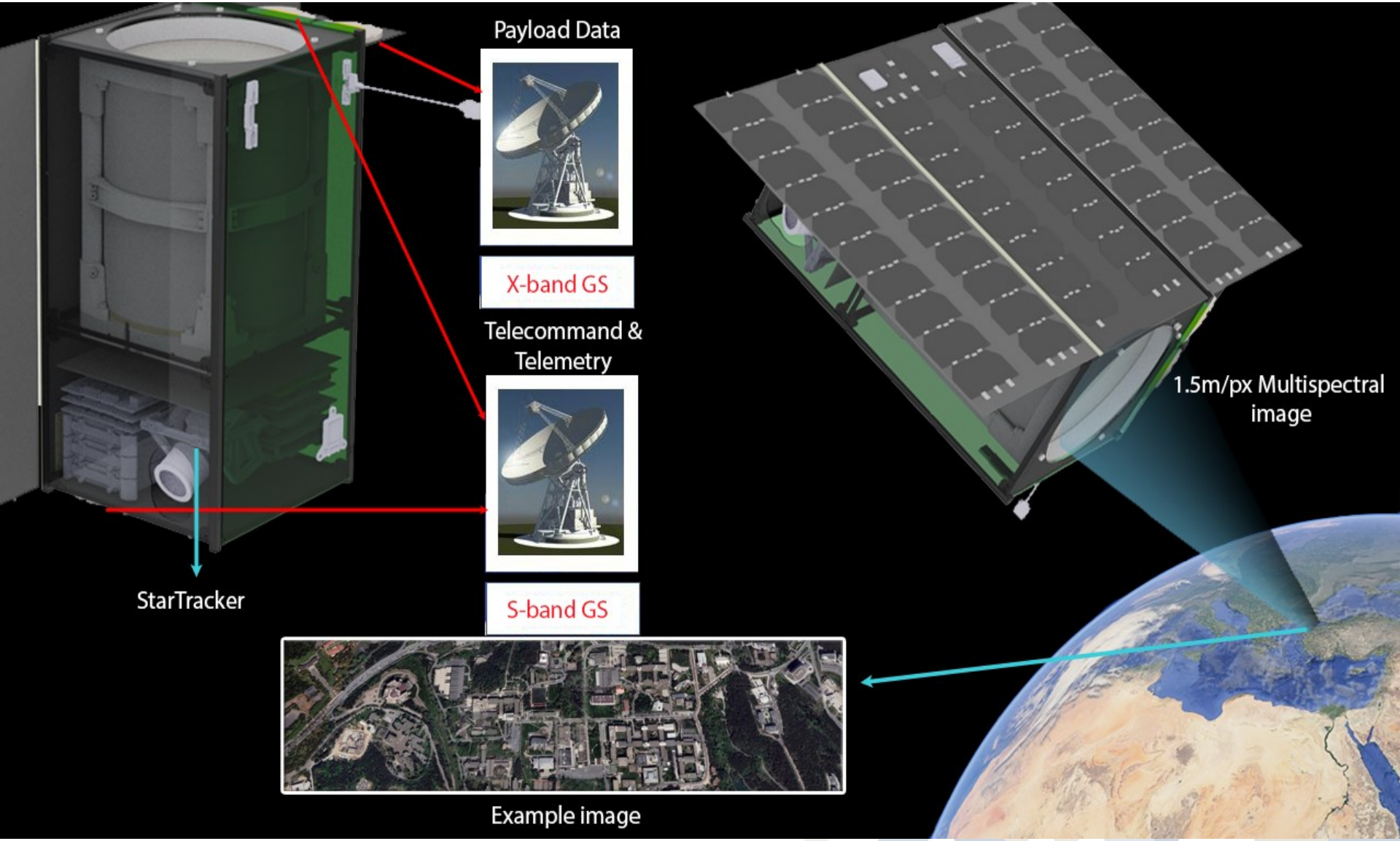


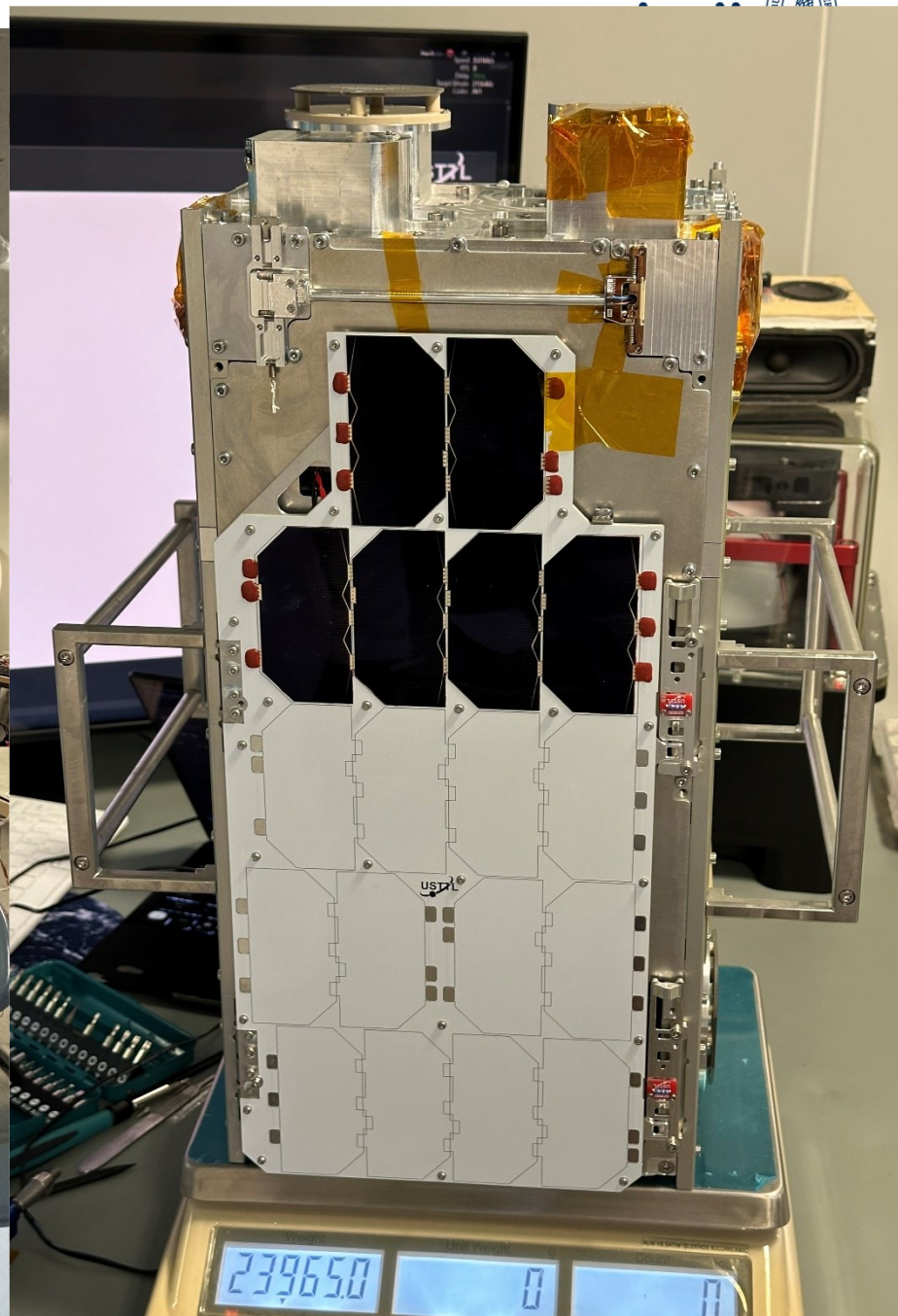
EAST UAE



ISKENDERUN BAY

1.5M GSD at 500 km Earth Observation Mission

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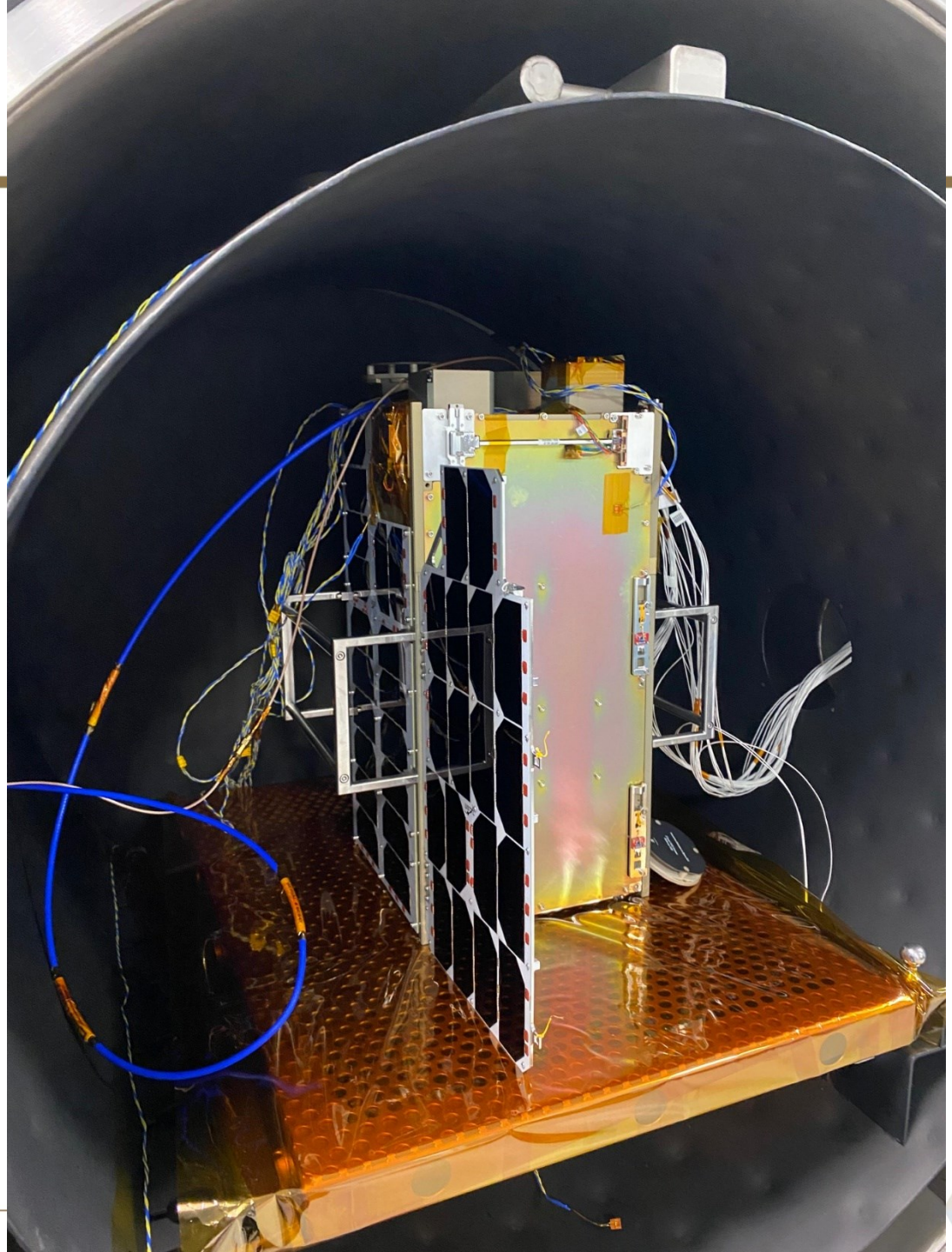
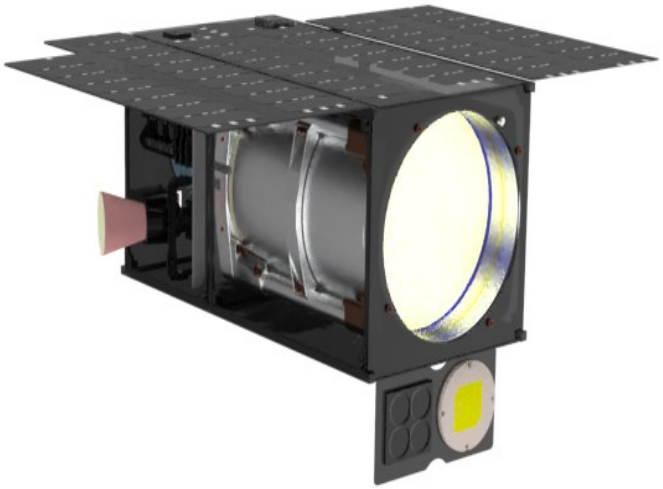
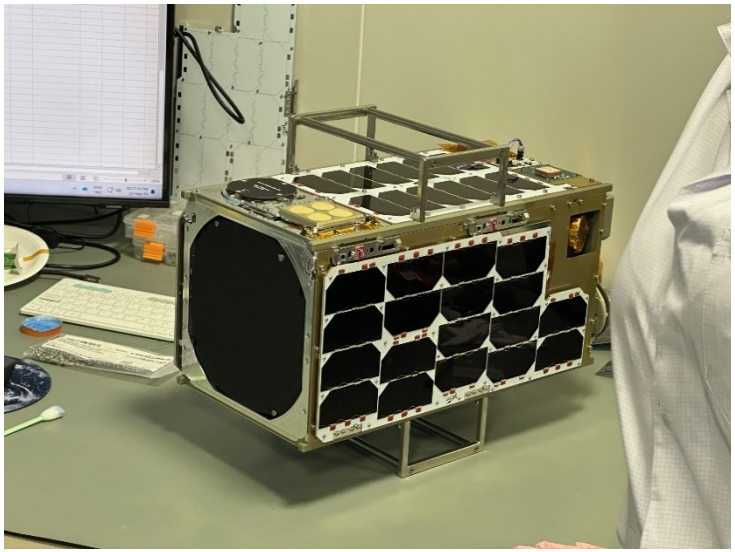
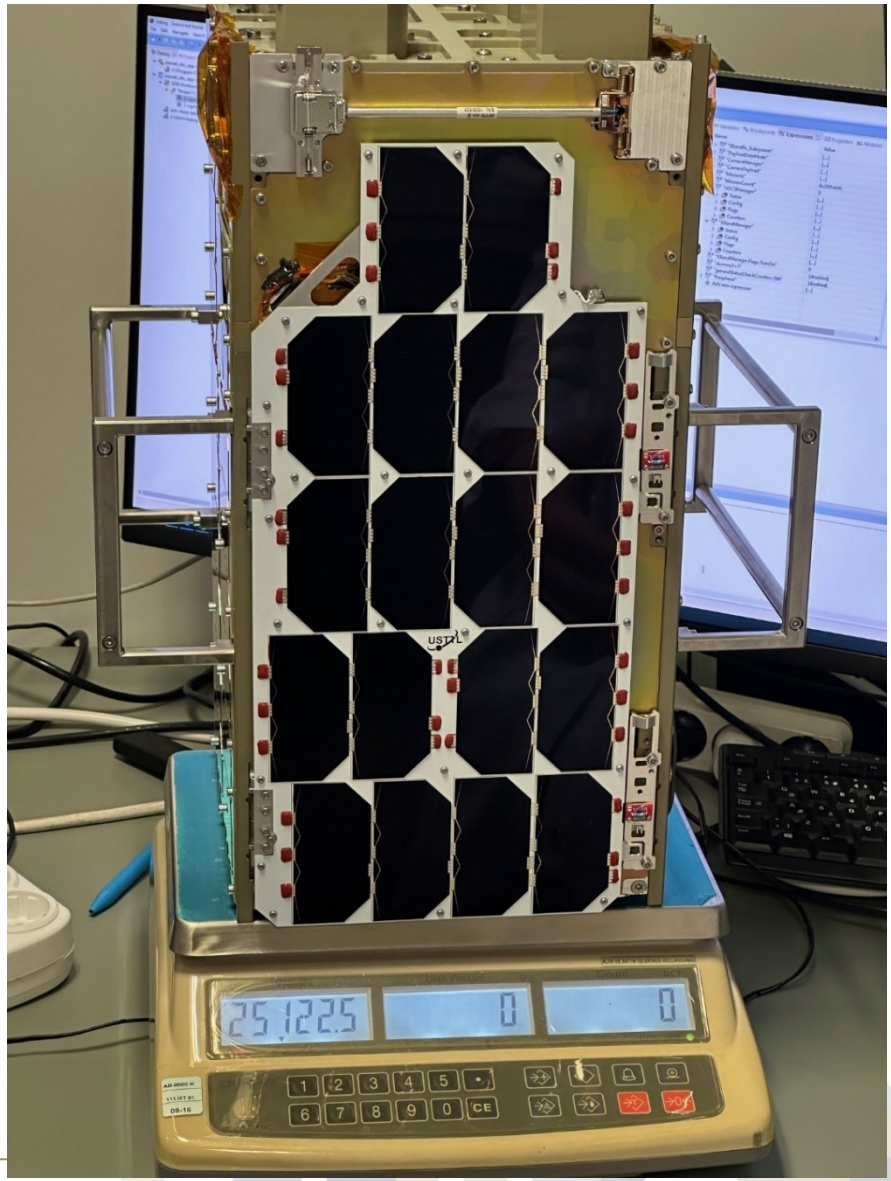


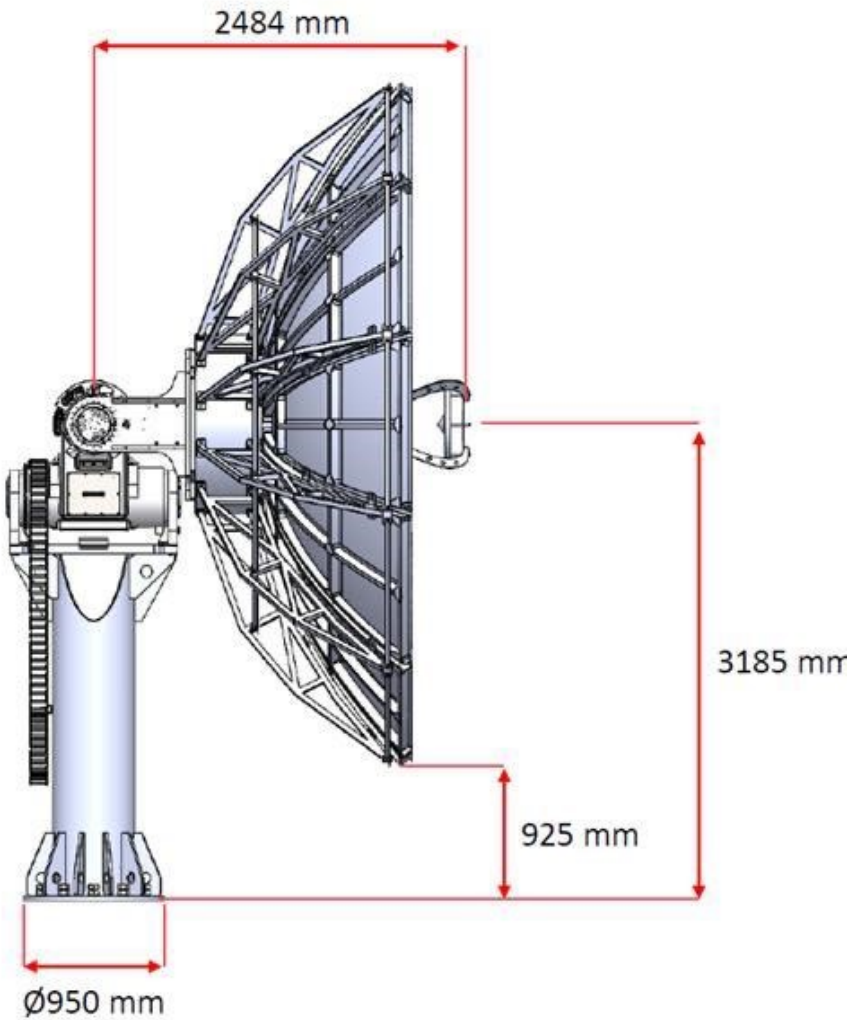
FM-1.5 m GSD MS 16 U 24 kg
Launch 16 Jan 2025, T12



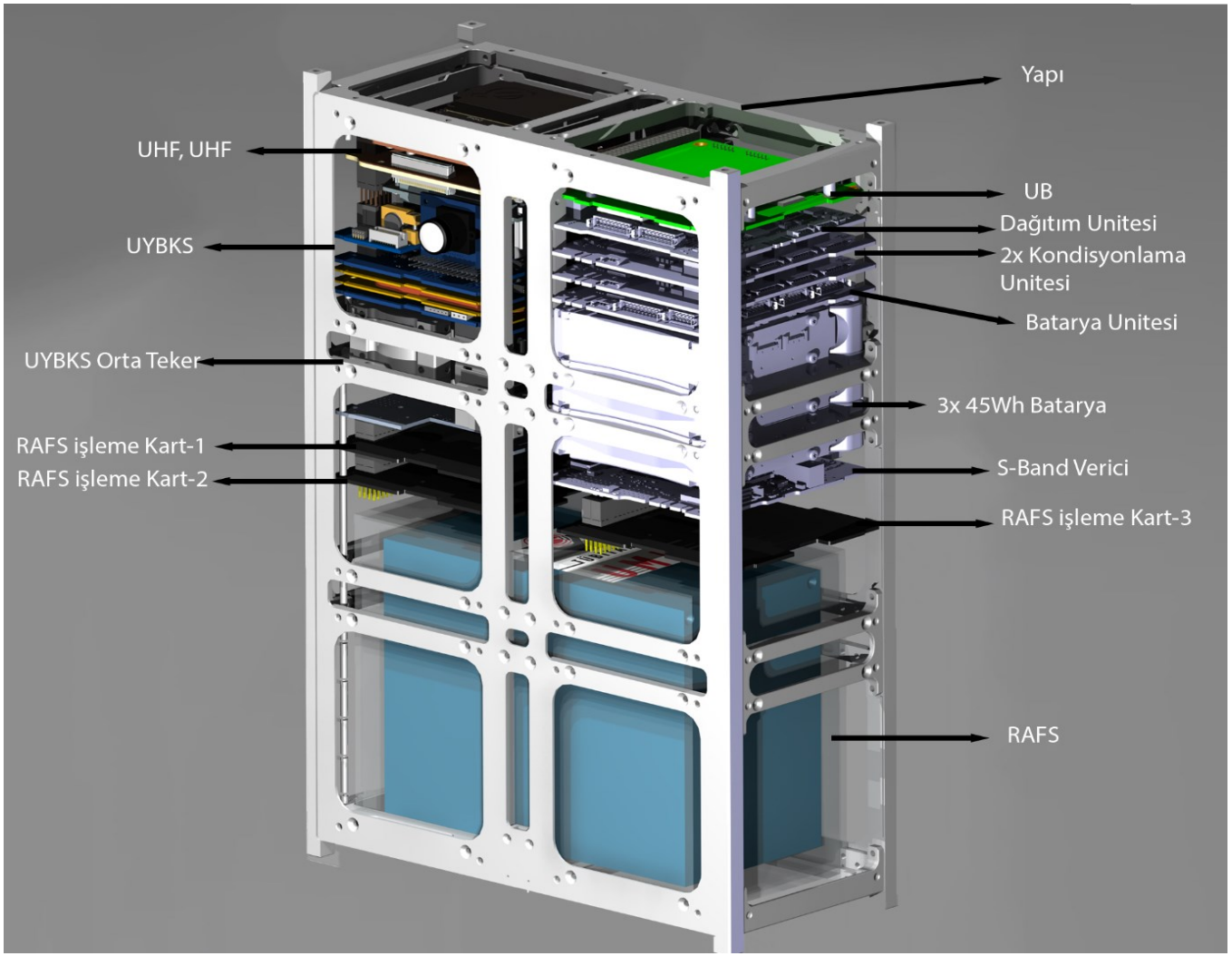




S/X BAND GS



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

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

Türkiye Uzay Ajansı

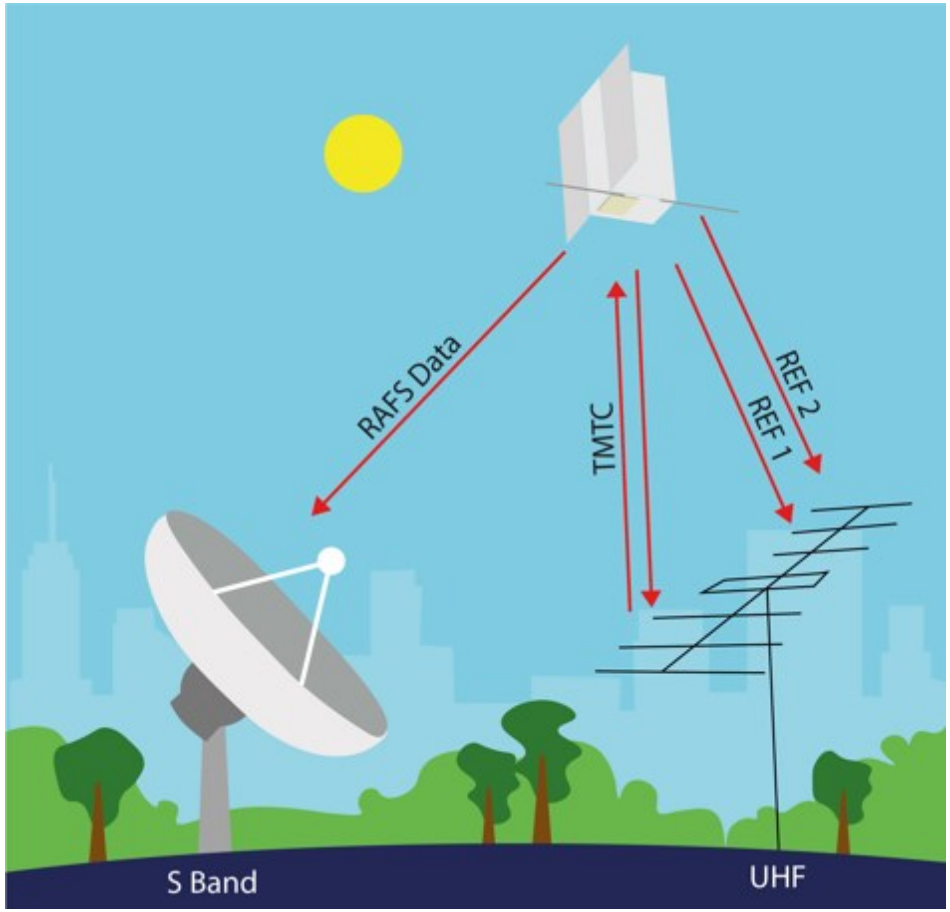
TÜBİTAK

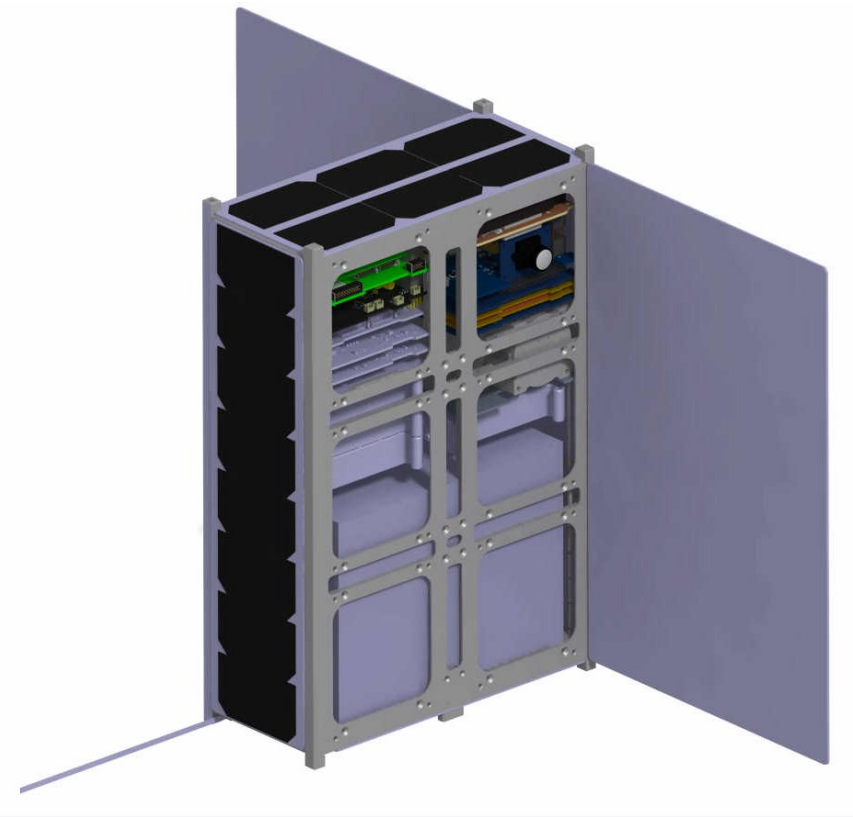
ITU/FAA
Faculty of Aeronautics and Astronautics
Space Systems Design and Test Laboratory
USTL

İTÜ RF ELEKTRONİK LABORATUVARI

TEKNOLOJİ

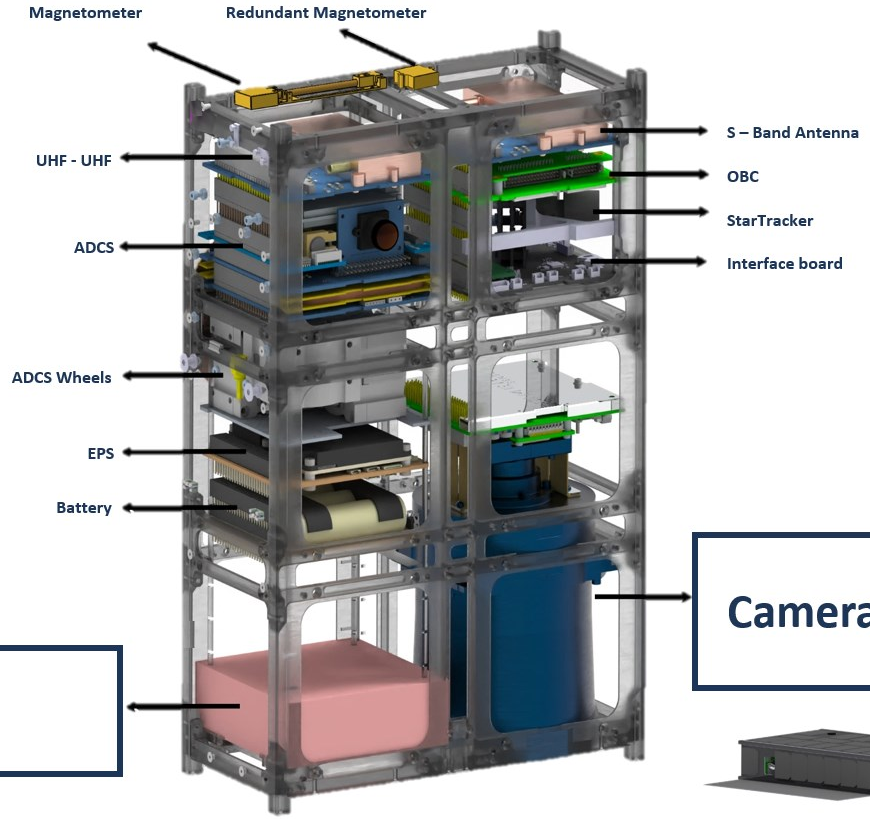
RAFS Concept of Operations





AGRISAT

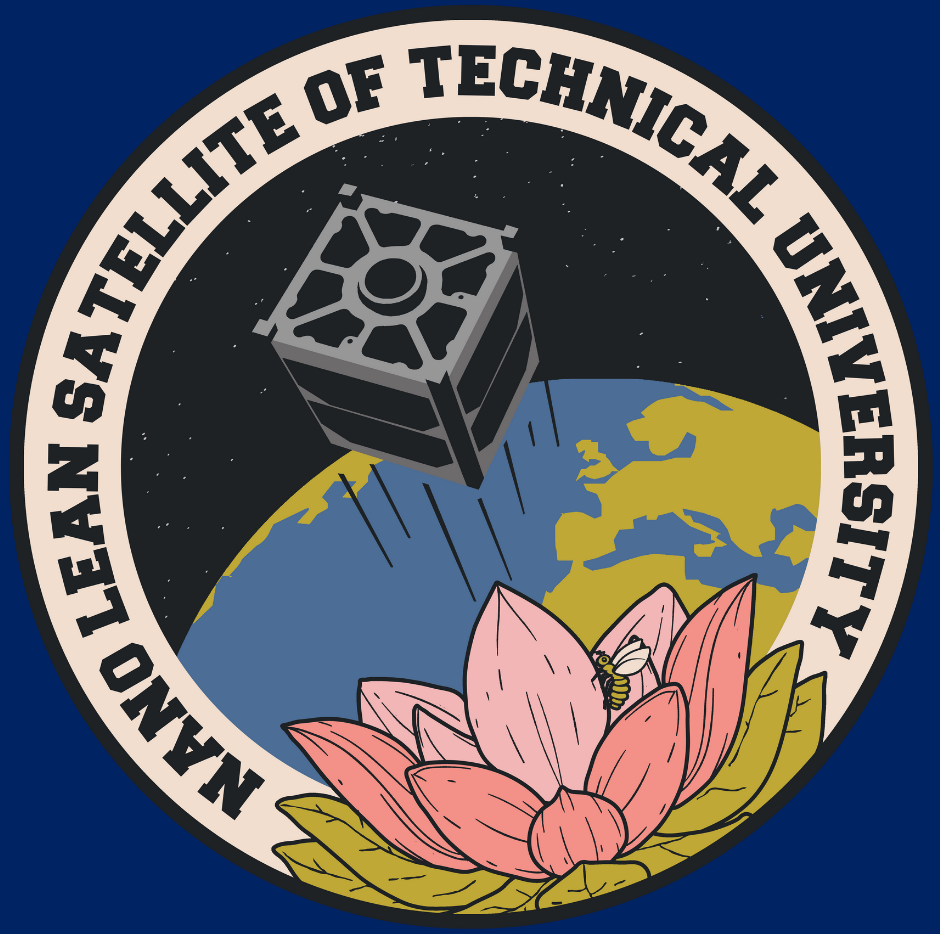
The CUBESAT



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

n-LOTUSat

A 1U CUBESAT PROJECT



PLAN-S SATELLITE & SPACE TECHNOLOGIES

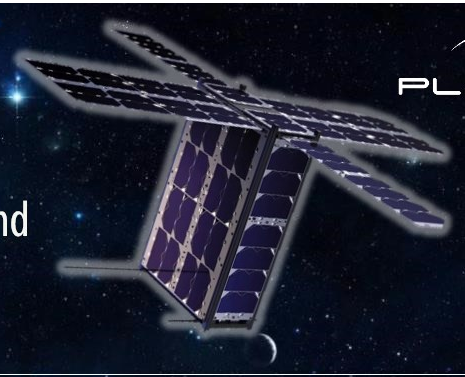
PLANS SATELLITE TECHNOLOGIES

- Establishment Summer 2021
- IoT and EO Constellations of 3U and 6U CubeSats
- Building tech demo missions
- 9 CubeSats in orbit,
- 4 IoT payload CubeSats in orbit being tested

https://www.linkedin.com/posts/weareplans_weareplans-plans-selfie-activity-7046485868856918016-UuNT/?utm_source=share&utm_medium=member_ios

[Post | LinkedIn]

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

PARTNERSHIPS

Partner on Satellite Design, Development & Testing

İstanbul Technical University
Space Systems Design and Test Laboratory

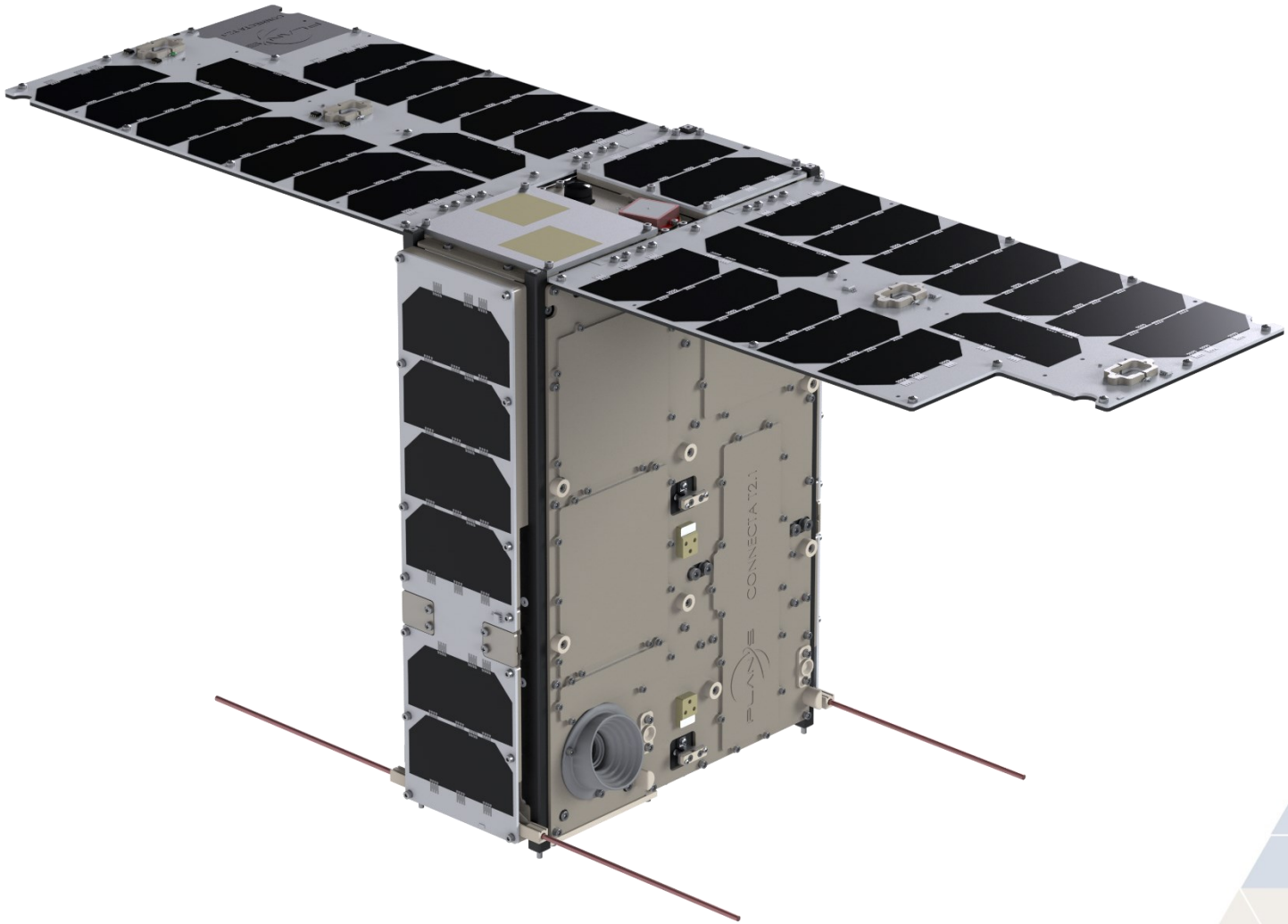
Potential Partner on Multispectral Cubesat Cameras

Dragonfly Aerospace
Caiman Award Program

PLANS
SATELLITE & SPACE TECHNOLOGIES

Potential Partner on Image Processing & Machine Learning

İhsan Doğramacı Bilkent University
Electrical & Electronics Engineering Dept.


CONNECTA T2.1

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https://www.linkedin.com/posts/weareplans_weareplans-plans-selfie-activity-7046485868856918016-UuNT/?utm_source=share&utm_medium=member_ios

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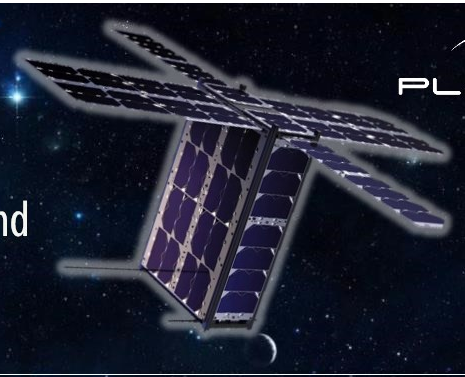

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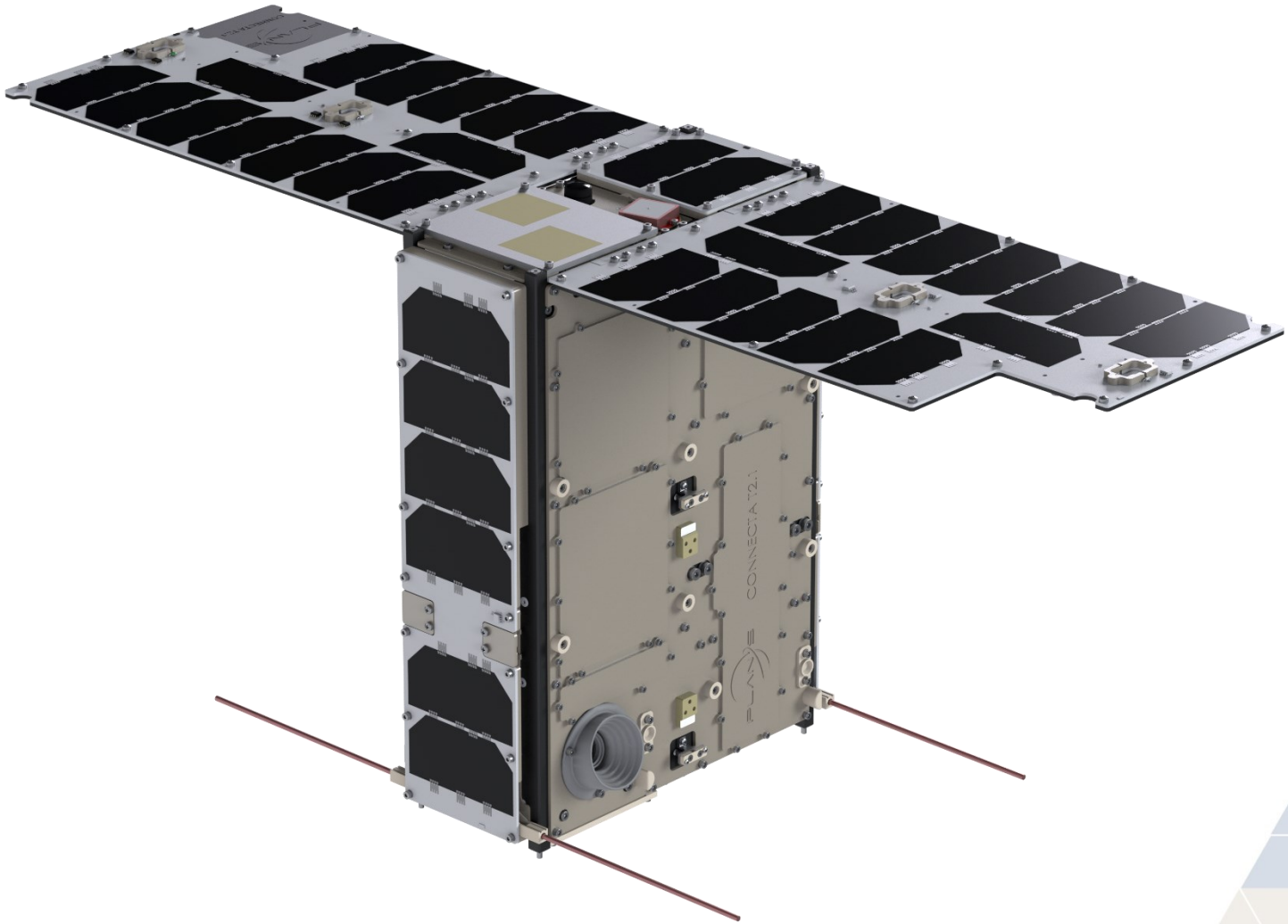
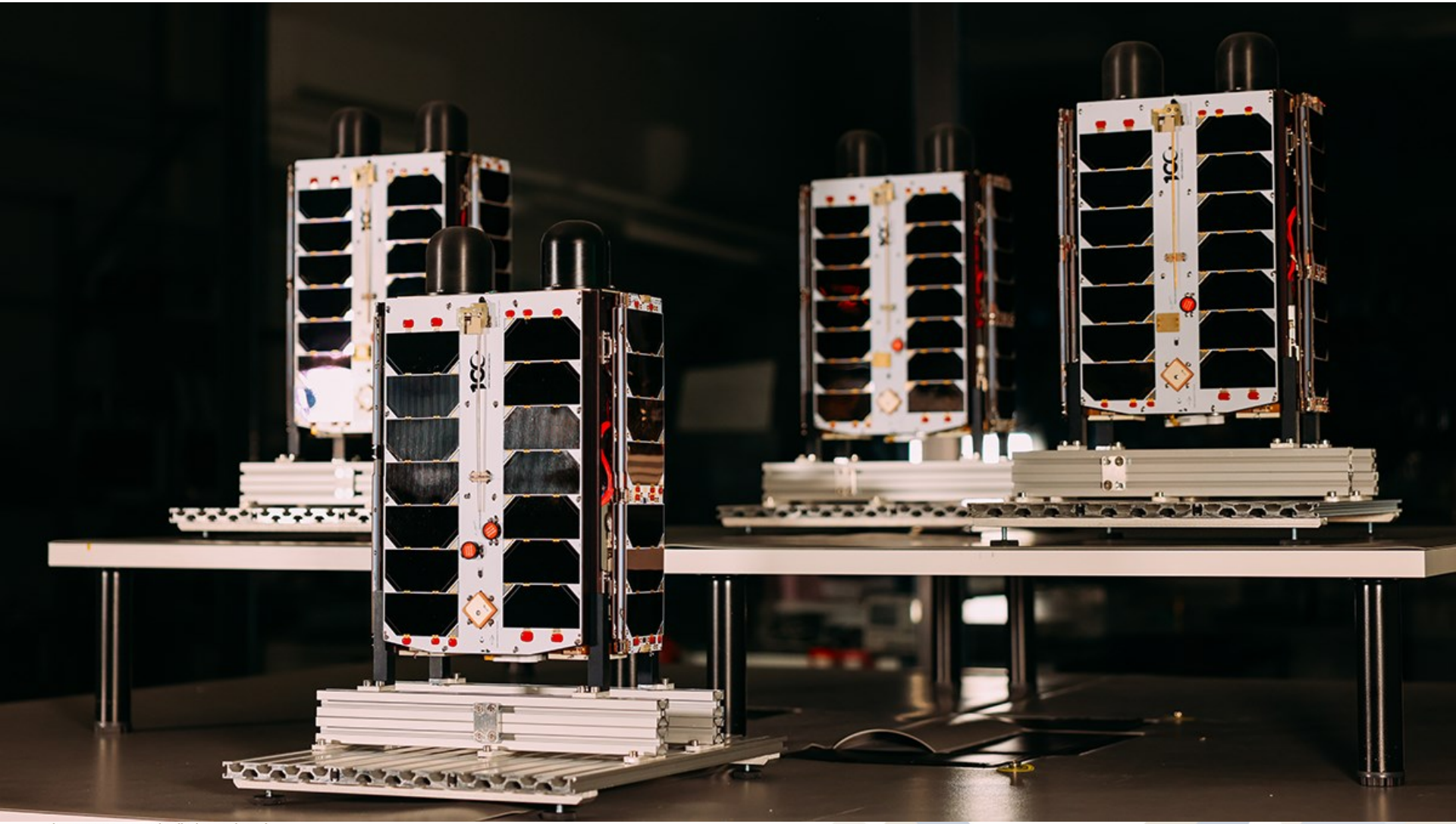

CONNECTA T2.1

Jumeirah Palm Island/Dubai
2023-07-08 UTC: 06:33:58

Plan S 4 IoT CubeSats



TARGETS

EDUCATE AND TRAIN ENGINEERS ON SPACE SYSTEMS, SATELLİTES AND ROCKETS
DEVELOP NANOSAT SYSTEMS TO ADVANCES KNOWLEDGE SCIENCE AND TECHNOLOGY

Increase capacity of subsystems

- To improve comm speed
- To improve data transfer rates
- To improve agility
- To improve power generation
- To improve lifetime in low orbits
- To improve space Env tolerances
- Fault tolerant Software architectures
- Ground station non amatuers

HELP NATIONAL and REAGIONAL SPACE TECHNOLOGY DEVELOPMENT

KEEP IT MULTIDISCIPLINARY, INTERNATIONAL AND MULTI INSTITUTIONAL

- Analyses of missions
- Earth orbiters
- Travels to moon and Mars
- Randevouz with space objects
- On board propulsion SYSTEMS, Water based SYSTEMS, Hybrid rocket development

We Look Forward To a Fruitful Cooperation

Towards being a civilization living in the Solar System

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Department of Space Engineering
+90532 480 3449
aslanr@itu.edu.tr
usttl.itu.edu.tr