The 2nd UNISEC-GLOBAL MEETING
KIT, Kitakyushu, Japan
18-20 November 2014

Turkish UNISEC (UTEB) 2014 Activities

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İTÜ

UNISEC

TURKEY

University Space Engineering Consortium

JOINT UNDERTAKING of ACADEMIA Governement, Aerospace Co. and SMEs

- Istanbul Tecnical University
- Airforce Academy, Sabancı University
- AES Aero (SME)
- Ertek Ltd. (SME)
- Gumush Space(SME)
- HAVELSAN
- ASELSAN
- AMSAT-TR
- Turkish University Union of Space Engineering
- Turkish Aerospace Industries
- TURKSAT Co.
- Ministry of Transportation, Communications

UNISEC-TR History

- Started Nov 2011, by three Istanbul Universities (ITU, TurAFA, YTU)
- Over 20 participant universities
- Support of government, aerospace industry and research institutions
- 6 meetings so far hosted by starters and supporting institutions
- Working on establishing UTEB as a legal entity
- Define a joint project with governement and industry support based on national needs
- İnternational cooperation

MEETINGS

Meeting #	HOST, Location	Date	University Participation	Institutional Participation
1	İTÜ, Istanbul	2.11.2011	21	0
2	RAST 2013, Istanbul	13.06.2013	14	5
3	AIAC 2013, METU, Ankara	12.09.2013	11	8
4	TUBITAK SPACE, Ankara	06.12.2013	14	9
5	ISTANBUL TECHNOCITY, Gebze	04.03.2104	10	10
6	TurAFA/ASTIN, Istanbul	20.06.2014	13	4
7	Anadolu Univ., Eskişehir	Dec. 2014		

Turkish Space Program

- Starting in 1989, Turkey ordered a number of **communication satellites** of which the first one were placed in orbit in August, 1994.
- New decisions have been made by the **government to support industry and research establishments including universities** to carry out research, design and development studies on space technology.
- One of such decisions was made in 2005 by the **National Higher Council of Science and Technology** that set specific goals and budgeted **space technology projects**.

- Development of qualified work force

DIRECTORATE GENERAL OF AERONAUTICS AND SPACE TECNOLOGIES (HUTGM)

Recently set up an office that will become a **National Space Agency**

Established in **November 2011**
Operational since **August 2012**

A diverse range of space actors;

State Planning Organization,
The Ministry of Transportation, Communşcations and Maritime
The communications satellite operator - TURKSAT,
The National Scientific and Technlogical Research Council - TUBITAK,
The Ministry of Defence R&D department,
The Under secretariat for Defense Industries (SSM).

Defence companies **Aselsan**, **Roketsan** and **Turkish Aerospace Industries**, as well as three major universities, are also involved in space programmes.

DUTIES AND RESPONSIBILITIES

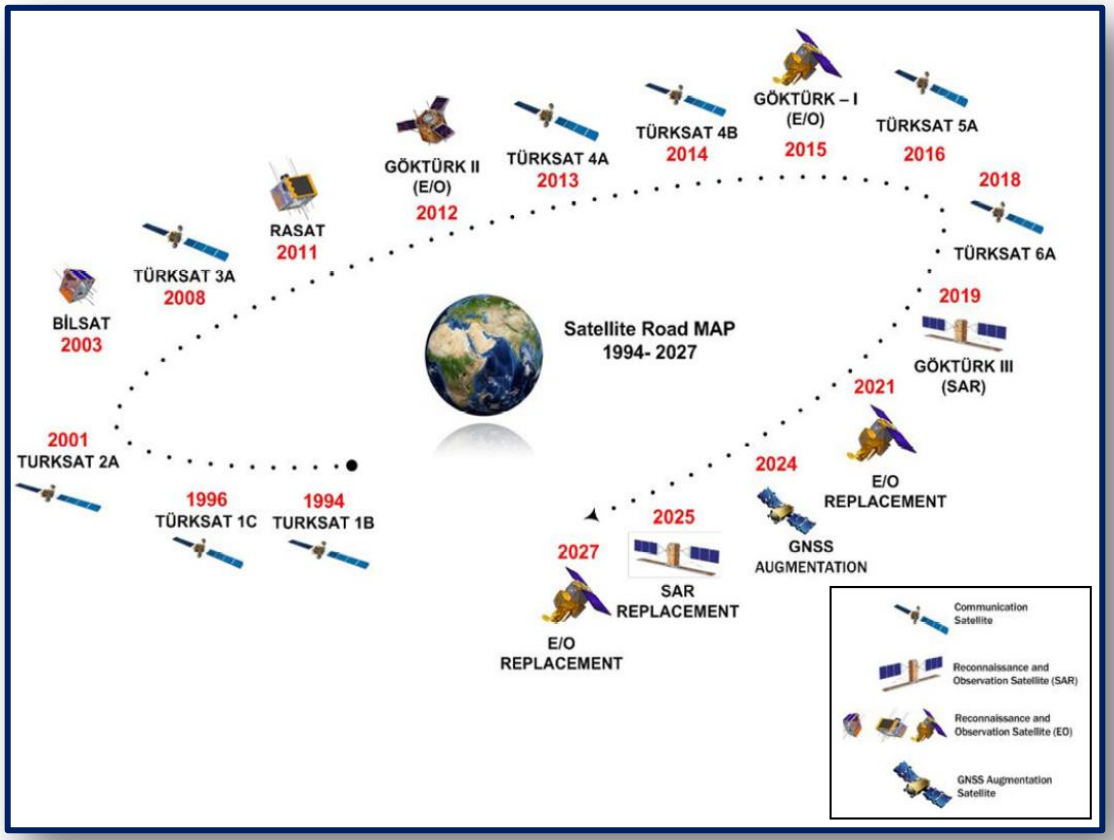
In the field of Aeronautics and Space Technologies,

- Establishment, Development and Operations of related infrastructures,
- Coordination with relevant agencies and organizations,
- Preparation of National Aeronautics and Space policies and strategies,
- Services related to the conduct of international relations.

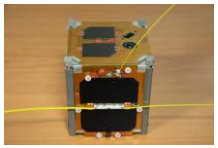
These efforts will be better coordinated with the establishment of the **National Space Agency**

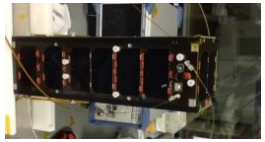
Turkish Satellites

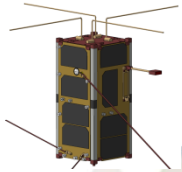
Road map of the space program that boasts several telecommunications spacecraft and two Earth-observation satellites, with plans to build more.



ITUpSAT1(2009) 3USAT-1(2013) 3USAT-2(2015) BeEagleSat-HAVELSAT(2016)





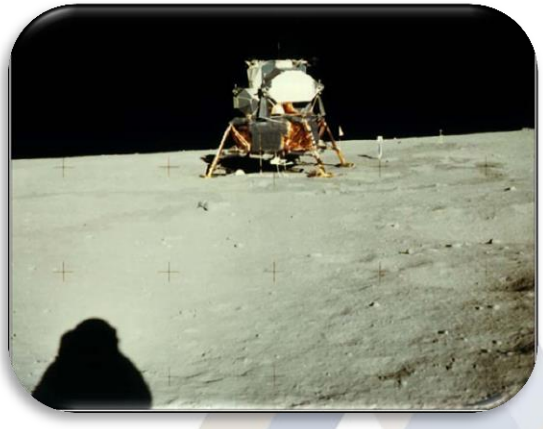


A total of **17 Turkish satellites** will come into orbit from **2012 to 2020**.

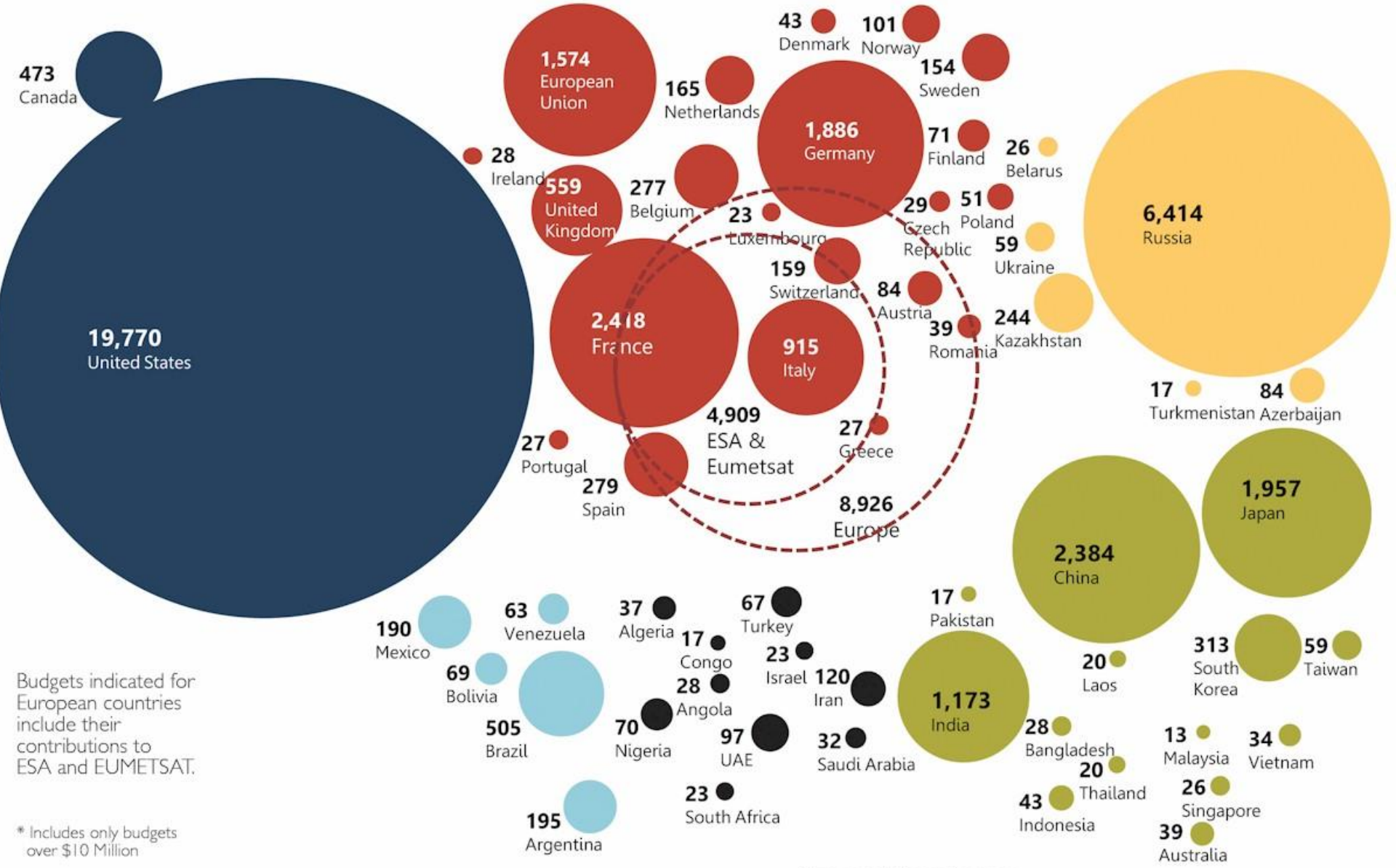
World Space Programs Today...

Many countries of the world have individual government-sponsored space programs... as well as there are group efforts that combine multi-national expertise...

Austria
Australia
Brazil
Canada
Chile
China
Czech Rep
Europe
France
Germany
Hungary
India
Indonesia
Iran
Iraq
Israel
Italy
Japan
Kazakhstan
Luxembourg
Malaysia
Mexico
Multi-national
North Korea
Norway
Pakistan
Philippines
Portugal
Russia
Saudi
Singapore
S. Korea
Spain
Sweden
Taiwan
Thailand
Turkey
UAE
UK
Ukraine
USA



WORLD GOVERNMENT EXPENDITURES FOR CIVIL SPACE PROGRAMS (2013)* TOTAL $43.7 BILLION



Budgets indicated for European countries include their contributions to ESA and EUMETSAT.

* Includes only budgets over $10 Million

Government Space Programs

2014 Summary

- 2 UTEB Meetings (total of 6 meetings)
- 7th meeting planned following UG2
- Application for Local Chapter of UG2
- H2020 applications with other UNISEC members
- 1st Turkish CanSat Leader Training Course
- MIC3
- UN Mexico Symp on BSTI
- Ongoing projects (QB50, 3USAT etc)
- Efforts Towards an association, lawyer help
- Strong support of aerospace industry
- Efforts toward formulating a multi-institutional nanosat project. Funding ???

UNISEC-TR Meetings (6)

13 Universities, 4 supporters

- Anadolu Üniversitesi
- Ankara Üniversitesi
- Atılım Üniversitesi
- Boğaziçi Üniversitesi
- Ege Üniversitesi
- Erciyes Üniversitesi
- HHO
- İstanbul Üniversitesi
- İTÜ
- Koç Üniversitesi
- Sabancı Üniversitesi
- THK Üniversitesi
- Yıldız Teknik Üniversitesi

- STM A.Ş.
- SDT Uzay ve Savunma Teknolojileri
- İstanbul Barosu Hava ve Uzay Hukuku Komisyonu
- TUSAŞ /TAI

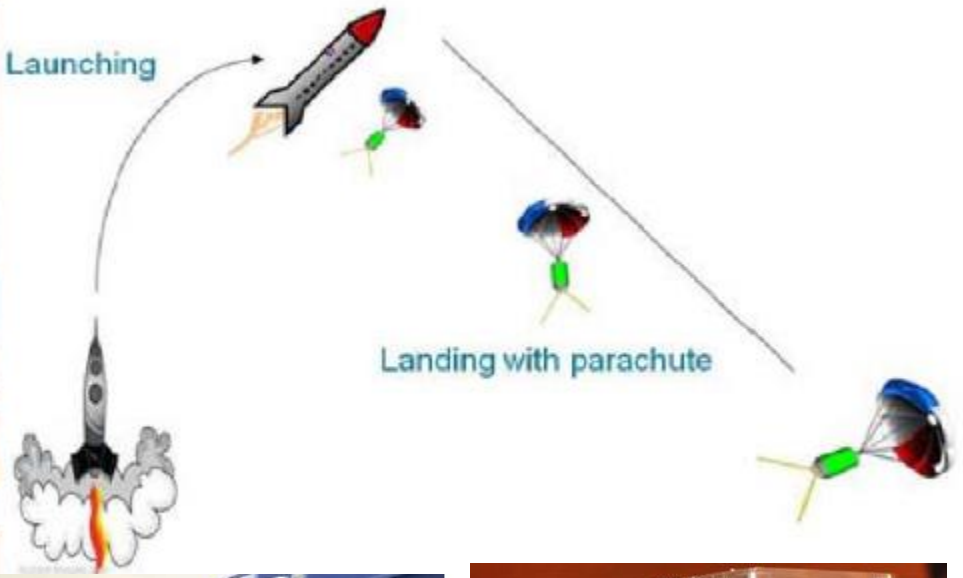
Presentations on

- Info on UNISEC Global Activities
- QB50 project
- Use of composites in space app
- Image processing, scientific Sensor development
- Space propulsion, small sat launchers
- International CanSat competitions

2014 Project Proposals

- H2020
  - COMPET-10-2014 – Outreach Through Education
    - **Hands-On! Launching European Space Careers**
    - Julius-Maximilians-Universität Würzburg and many others
  - COMPET-6: A multipurpose Mini Space Particle Telescope (MINI-SPT) with high accuracy energy, time-of- flight and tracking measurements capabilities (Italy, Spain and Turkey)
- TUBITAK
  - CZECH Republic
  - TUNISIA

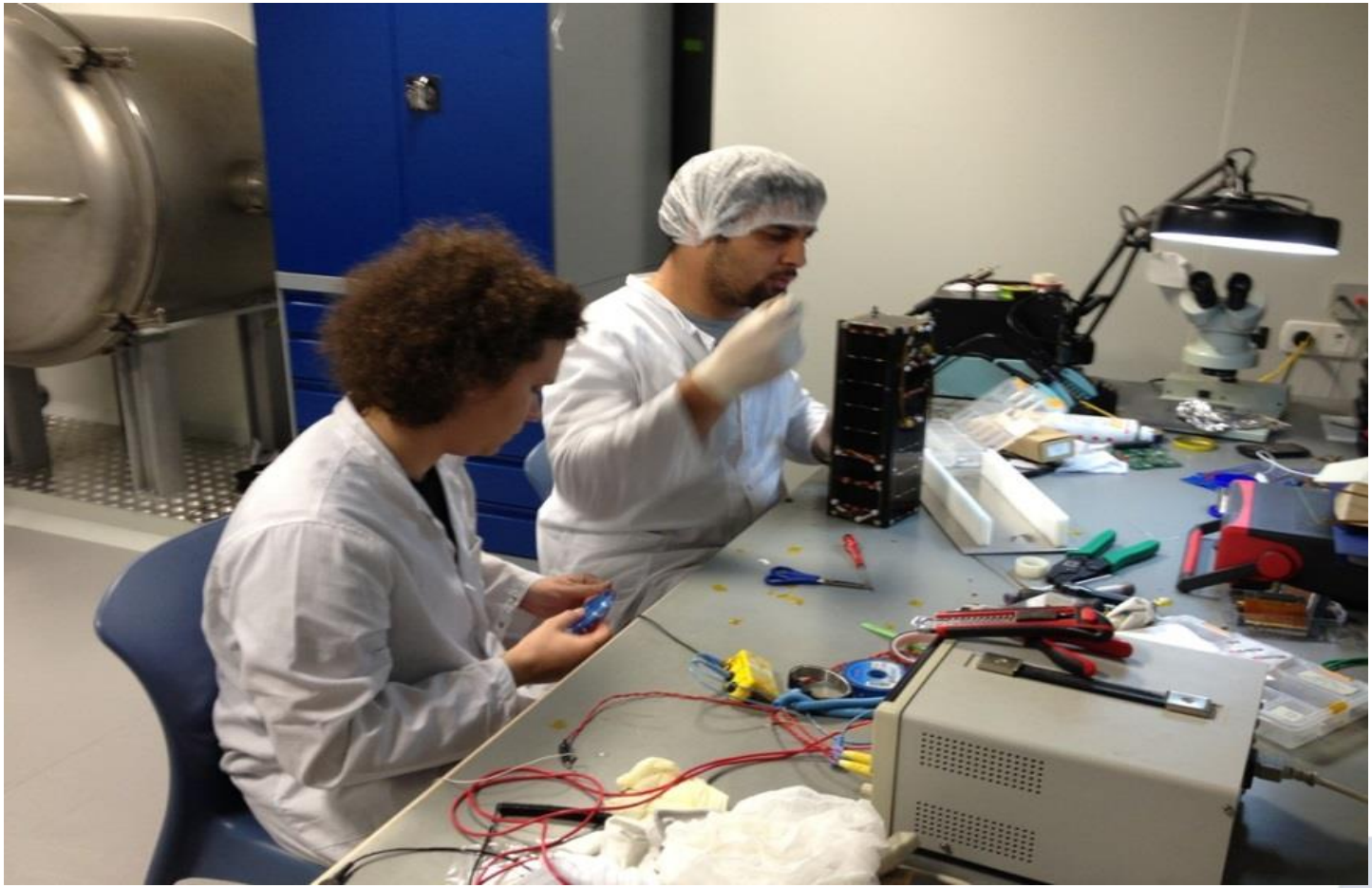
UTEB CLTP-TR COURSE



CanSAT Launch

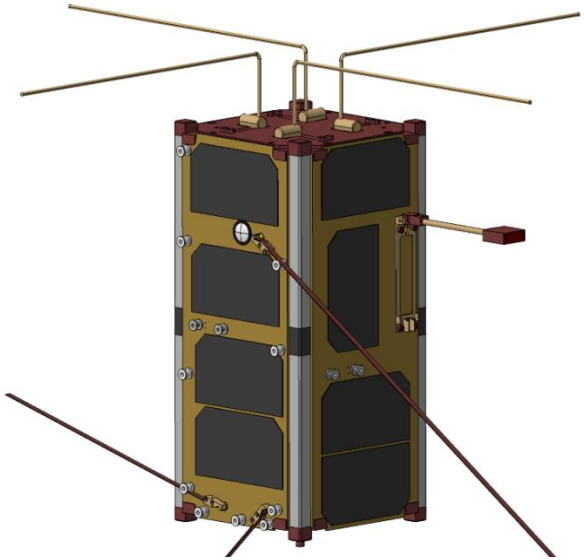
- 16-27 June 2014
- İTÜ Ayazağa Campus
- 12 participants from 5 UTEB üniversities

3USAT Assembly in Clean Room



BeEagleSAT and HavelSat

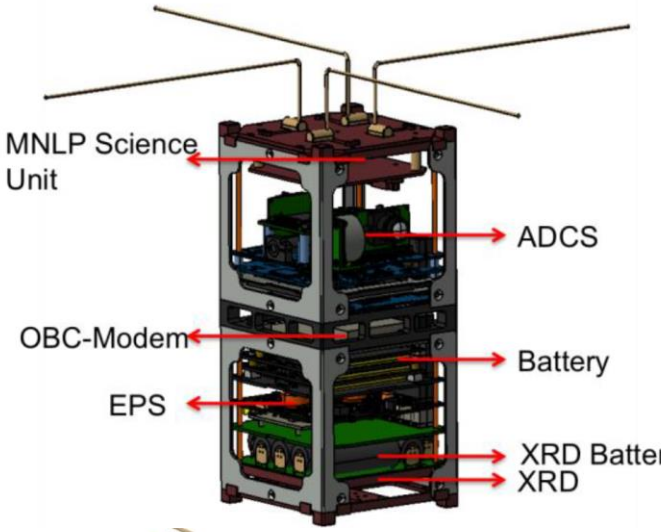
- BeEagleSAT is a joint project of Istanbul Technical University, Turkish Air Force Academy, and Sabanci University along with SMEs and Industry (UTEB MEMBERS).
- One of 2U CubeSats of the QB50 Network
- HavelSat is developed by ITU and Havelsan Co

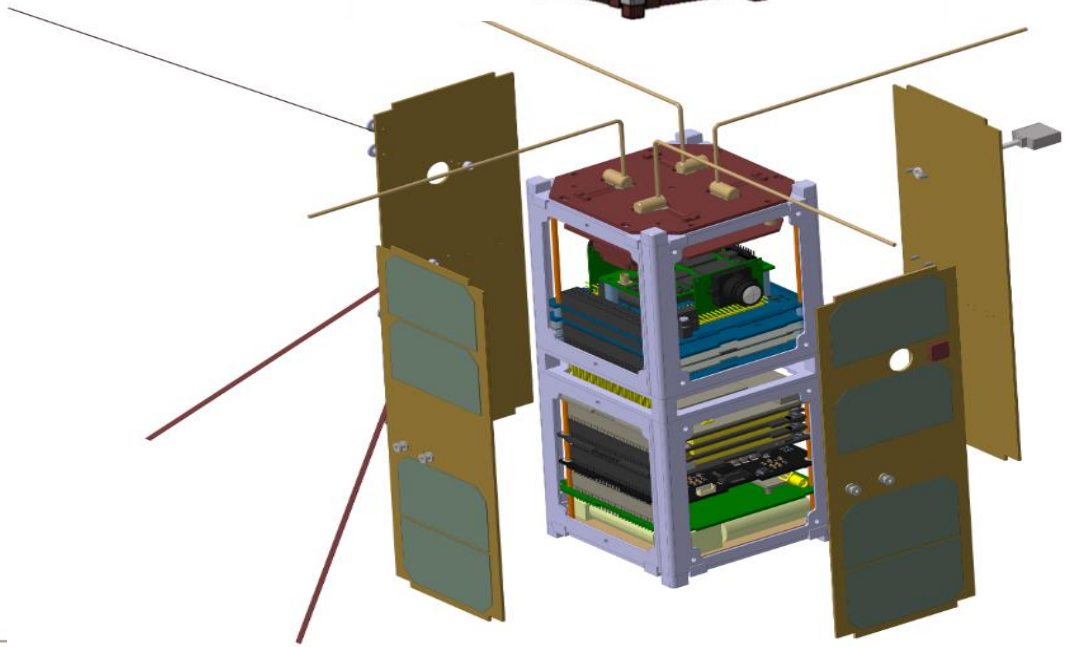


SEVENTH FRAMEWORK PROGRAMME

BeEagleSat/HAVELSAT of QB50

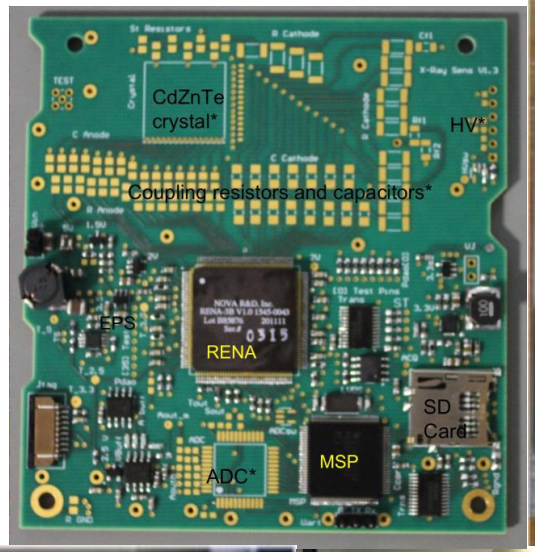
SEVENTH FRAMEWORK PROGRAMME

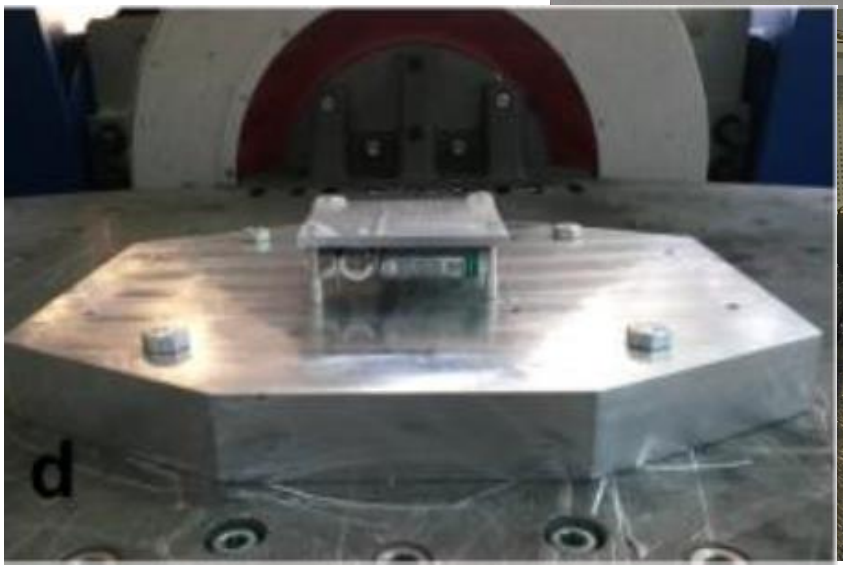


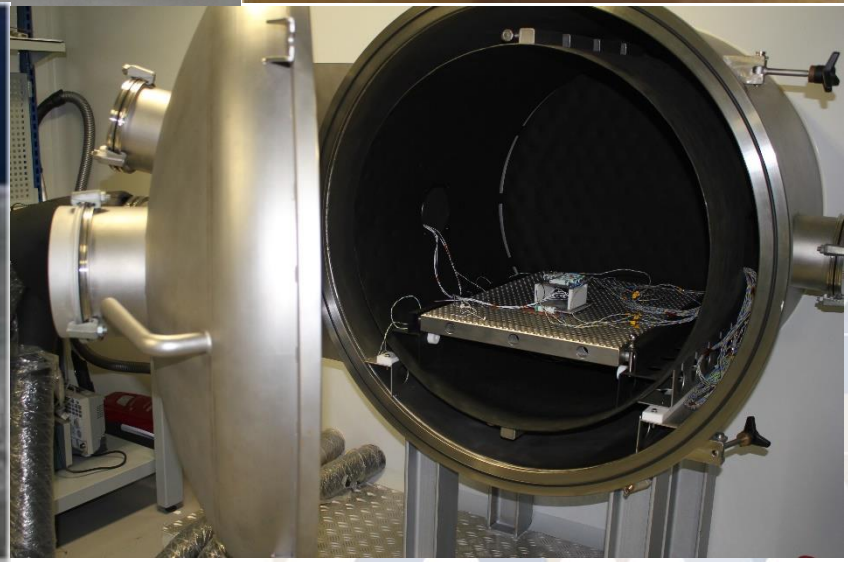


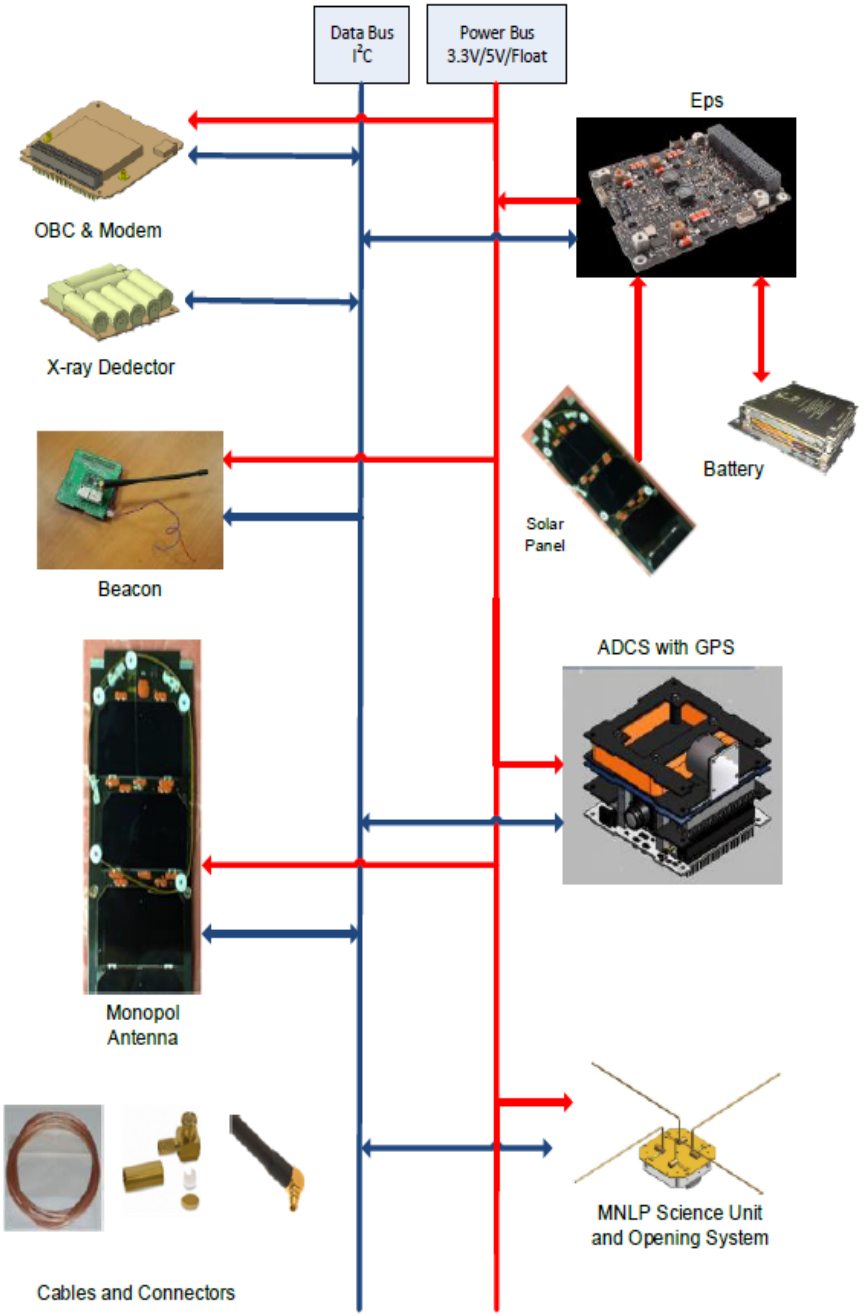
XRD of BeEagleSat

Lay foundations of producing scientific space payloads in Turkey!





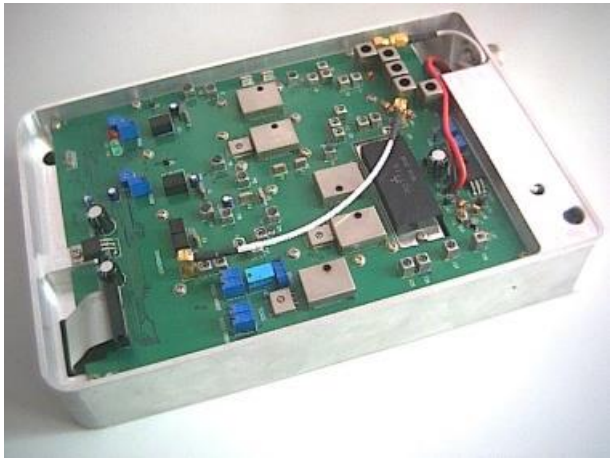


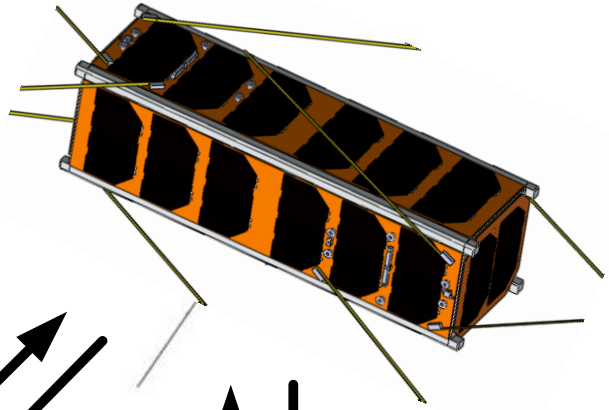

Data Bus
I²C
Power Bus
3.3V/5V/Float
Eps
OBC & Modem
X-ray Dedector
Battery
Solar
Panel
Beacon
ADCS with GPS
Monopol
Antenna
MNLP Science Unit
and Opening System
Cables and Connectors

QB50 Project Benefits

- A good example of multi institution international collaboration
- Mix of budgets: from QB50 and local budget
- Local budget from UTEB members, aerospace industry, ITU spinoff mikroSMES
- Two QB50 WS meetings per year
- Detailed very valuable documentation
- A good school for enhancing spacecraft design, management and ground station operation skills
- Carrier possibilities for students, young engineers

X/Ku-Band Comm on aCubeSat





Satellite

VHF UPLINK

UHF DOWNLINK

Ku Band UPLINK

X-Band DOWNLINK

GS-1
TM/TC

GS-2
Transponder

OUTREACH at High Schools

BENEFITS

- **CanSats and Nano Satellites are a very useful tool for starting space work by everybody.**
- Students, through hands-on work, developing the necessary skills and experience to succeed in the space industry.
- Overall, nanosat projects provide an outstanding intercultural experience and a global network of students and engineers with the possibility of exchange and cooperation programs.
- UTEB/UNISEC like bodies ay facilitate project development and funding

- NANOSATs may be the answer to very large bugeted, long time taken governement space programs.
- Improving capability NanoSat in mission VS very capable largeSat in development.

2015

- Further UTEB Meetings (8th...)
- 2nd Cansat Course in early 2015
- Ongoing projects (QB50, 3USAT etc)
- Efforts Towards forming an association
- Efforts toward formulating a multi-institutional nanosat project. Look for funding
- WAY FORWARD
- A legal association with individual members OR
- An advisory and facilitator umbrella institution
  - Leagal issues and funding to be handled by universities

We Look Forward To a Fruitful Cooperation

Towards being a civilization living in the Solar System

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