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

Turkish UNISEC (UTEB) 2014 Activities

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JOINT UNDERTAKING of ACADEMIA
Governement, Aerospace Co. and SMEs

• Istanbul Technical 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 government and industry support based on national needs
• International cooperation
<table>
<thead>
<tr>
<th>Meeting #</th>
<th>HOST, Location</th>
<th>Date</th>
<th>University Participation</th>
<th>Institutional Participation</th>
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<td>Anadolu Univ., Eskişehir</td>
<td>Dec. 2014</td>
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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
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, Communications and Maritime
The communications satellite operator - TURKSAT,
The National Scientific and Technological 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.
Road map of the space program that boasts several telecommunications spacecraft and two Earth-observation satellites, with plans to build more.

A total of 17 Turkish satellites will come into orbit from 2012 to 2020.
Many countries of the world have individual government-sponsored space programs... as well as there are group efforts that combine multi-national expertise...

Austria  Iraq  Russia
Australia  Israel  Saudi
Brazil  Italy  Singapore
Canada  Japan  S. Korea
Chile  Kazakhstan  Spain
China  Luxembourg  Sweden
Czech Rep  Malaysia  Taiwan
Europe  Mexico  Thailand
France  Multi-national  Turkey
Germany  North Korea  UAE
Hungary  Norway  UK
India  Pakistan  Ukraine
Indonesia  Philippines  USA
Iran
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
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
- Atatürk Üniversitesi
- Boğaziçi Üniversitesi
- Ege Üniversitesi
- Erciyes Üniversitesi
- HHO
- İstanbul Üniversitesi
- ITÜ
- 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
CanSAT Design and Building Course

- Descend and Landing System Design
  - Introduction
  - Forces Acting on the Parachute
  - Equilibrium of Forces in Steady Descent
  - Parachute characteristics and performance
  - Parachute simulation during descending

\[ P = \frac{C_d A V^2}{2} \]
\[ z = \frac{T}{A} \ln\left( \frac{P_1}{P_2} \right) \]
\[ F_D = \frac{1}{2} \rho C_d A V^2 \]
CanSAT Launch

- 16-27 June 2014
- İTÜ Ayazağa Campus
- 12 participants from 5 UTEB universities
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 (UTESB MEMBERS).
- One of 2U CubeSats of the QB50 Network
- HavelSat is developed by ITU and Havelsan Co
BeEagleSat/HAVELSAT of QB50
XRD of BeEagleSat

Lay foundations of producing scientific space payloads in Turkey!
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
OUTREACH at High Schools
• 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 budeted, long time taken governement space programs.

• Improving capability NanoSat in mission VS very capable largeSat in development.
• 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  
  • Legal issues and funding to be handled by universities
We Look Forward To a Fruitful Cooperation

Towards being a civilization living in the Solar System

Alim Rüstem ASLAN
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