Polish Student Activities in Space Research and Education

Warsaw University of Technology:

- Student Astronautical Group
- Student Space Engineering Scientific Group
- Radiolocation and Digital Signal Processing Students’ Research Group

Vienna, 12 – 15 February 2007
Our supreme goals:

- To extend our knowledge in Astronautics and related fields of science.
- To popularize Astronautics among the youth.
Space Related Education

At Warsaw University of Technology

- Faculty of Power and Aeronautical Engineering – Aerospace Specialization
- Faculty of Electronics and Information Technology – Satellite Communications
- Faculty of Geodesy and Cartography – Teledetection, Orbital Mechanics, Navigation
- Also at Universities in Wroclaw and Olsztyn
Student Parabolic Flight Campaign

- Competition of student ideas from all over the world (but only 30 places to take).
- WUT students participation since 1994
- Extremely fascinating opportunity to experience the lack of gravity.
- 30 seconds to feel like real astronauts.
Student Parabolic Flight Campaign

Our experiments:

- Burning liquids and fibres
- Diffusion flame in micro- and hypergravity
- Selfignition in microgravity
- Visualization of magnetic field in 0g
- Contiguous force in microgravity.
Student Parabolic Flight Campaign

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YES2: Young Engineers’ Satellite 2

- Foton attached module („FLOYD”)  
- Reentry capsule „Fotino”  
- „Spacemail” experiment  
  
  Safe and inexpensive method of bringing samples back to the Earth.

- Launch dated on September, 11th 2007  
- Fotino recapture in Kazachstan around 23rd
YES2: Young Engineers’ Satellite 2

Polish students’ tasks:

• Stepper driver
• Mechanical structure
• UHF link between tether ends
• Mobile Ground Station
SSETI - Express

• SSETI Express is the first ESA student satellite
• Launched into a Low Earth Orbit in October 2005 (27.10.2005)

• The satellite served as a technological demonstration and as a test bed for some of the hardware that will be used for ESEO
• Polish teams: Communication Team (Wroclaw University of Technology), Operations Team (Warsaw University of Technology)
European Student Earth Orbiter
The microsatellite objectives:
• taking pictures of Earth and Moon
• measuring radiation levels
• testing technologies for future missions.

Four Polish teams:
• Operations
• Mechanical/thermal configurations and structure
• On-Board Data Handling Module
• Communications (Wroclaw University of Technology Team)
SSETI – ESMO (Feasibility Study)

*European Student Moon Orbiter is to:*

- acquire images of the Moon and transmit them back to Earth for public relations and education outreach purposes
- perform new scientific measurements relevant to lunar science & the future human exploration of the Moon, in complement with past, present and future lunar missions
- provide flight demonstration of innovative space technologies developed under university research activities
PW-Sat

- A CubeSat being built at Warsaw University of Technology
- First Polish picosatellite
- Is supposed to test new alternative method of disposal inactive satellites from LEO
- Will have radio amateur transceiver on-board
- Destined to take a part in DGSS experiment
PW-Sat

• Unusual payload (kapton balloon)

• Easy way to keep LEO clean
• Scientific results on perturbations forces effects
Distributed Ground Station System

Improves access window time significantly and minimizes error rates for communication with satellites on Low Earth Orbit
Polish Academic Student Satellite:

- Panchromatic scanner (4m per pixel)
- Three communication channels (X band up to 80Mb/s)
- 120GB Memory (Solid State Recorder)
- RadHard, Fault Tolerant, Redundant CPU
- Cubic-look Structure
- Accurate Stabilization (Pointing accuracy: 0.2 deg)
- Bipropellant chemical propulsion.
Satellite Simulation Team

Research:
- SAR / ISAR / IfSAR Processing
- DSP Applications in Space
- Feasibility Study of the Space SAR radar
- Development of the satellites’ simulation software
- 3D Radar Simulations
- Microwave Amplifiers
- Mobile Communications
Design of Satellite Launcher – student project

- Rocket engines and stages calculation and design
- Thrust vector control
- Optimization of rocket’s trajectory
What’s more…

- Space Technology Education Conference
- International Astronautical Congress
- Seminaries in Space Research Center Warsaw
- Signal Processing Symposium
- International Air shows
- A lot of publications
- Space weekends, Science Fairs
- Meetings with Astronauts
Animation of satellite launch and deployment and other student’s activities related to Space Research
Thank you for your attention.

Students of Warsaw University of Technology