The ESA Education Office started the Student Space Exploration and Technology Initiative (SSETI) in 2000. The Initiative’s main objective is to create a network of students, educational institutions and organisations on the Internet, which together will have the means to design, build and launch micro-satellites. It also aims to increase knowledge about space among the European youth of today through hands-on experience. Students have the opportunity to put their theoretical skills acquired at university into practice, to design, develop and launch micro-satellites, and much more.

In order to achieve these objectives, the infrastructure and the means of communication for the more than 800 students interested in the project had to be put in place. In addition to tools such as E-mail, a Bulletin Board and a Participants database, a web site (http://www.sseti.org) has been designed and implemented by the students themselves, allowing the SSETI community to easily communicate, interact and work together remotely. ESA’s role includes the provision of communications, guidance, verification and testing support, as well as facilitating the launch arrangements.

Since SSETI’s first steps back in October 2000, around 20 different universities throughout Europe have become involved in the very first SSETI micro-satellite project, known as the ‘European Student Earth Orbiter (ESEO)’. The ESEO spacecraft is due to be launched on an Ariane-5 in late-2004.
Getting Organised

SSETI consists of two distinct elements:
– A centrally focussed organisation, led by the Education Office, whose tasks include the organisation, management and guidance of the project. This central organisation will provide the necessary Agency support in terms of expertise and testing and, ultimately, in negotiating the launch opportunity.
– A web-based organisation via which all of the parties involved can interact, communicate and meet in order to fulfil the goals.

The web site
www.sseti.org is the main point of reference for the SSETI project, where users can find all of the project-related information. It meets two important objectives: on the one hand it is the ‘working place’ for the SSETI community, and on the other it provides anyone who is interested with information about the project and its objectives, its current status, how to join, etc. Each registered user has a log-in and password affording full access to the information.

The web database
This database, developed by some of the SSETI students, is a part of the web site. Here one can find all the information related to the participants, addresses, universities, working groups, subsystems, profiles, etc. All SSETI project members must be registered in this database.

Chat sessions
Owing to the geographically distributed nature of the project, it is difficult for participants to meet physically at a given location. Internet-based ‘chat sessions’ allow them to conduct the meetings and reviews necessary for the day-to-day running of the project. Three weekly chat sessions are officially scheduled: two for the system-engineering team, and a general one for all the teams involved in the project.

E-mail messaging
E-mail is used extensively in SSETI, but there is no decision-making via e-mail. It is SSETI policy that all queries must be publicly addressed and discussed via a web-based User Bulletin Board (UBB). There are e-mail lists in place to facilitate such communication.

Requests for information
RFI is a particular way of addressing e-mails, in which the subject of the e-mail consists of the letters RFI followed by the reason for e-mailing and the deadline by which the question needs answering. If the e-mail is not answered before the deadline, the sender’s own assumed answer, which has to be specified in the body of the initial e-mail, becomes the official answer to the question posed.

File transfer
This is an easy and effective tool for uploading/downloading documents to/from the server. It is an essential means for sharing all of the project documentation.

Workshops
These usually take place twice a year at ESTEC in Noordwijk (NL) and last one week. Two people per team are normally invited and the main goal is to exchange data and discuss project issues. The time is usually divided between lectures from experts on different space-related topics, presentations, and teamwork in the ESTEC Concurrent Design Facility (CDF).

Being physically all together in one place not only helps teams to get to know each other and exchange and share ideas, but also serves as a valuable period in which much of the work is carried out and where they have ESA experts on hand to answer any queries.

The Workshops are also essential for making sure that the project is following a consistent and coherent path.

How to Join

To participate in SSETI, students can either join an existing team (usually the case when the project is in its development phase) or form a new team (usually the case at the beginning of the project). Each team has a subsystem assigned to it, for which it is then responsible (including the financing).

Each team usually has at least four different ‘coordinators’: a main coordinator, a data coordinator, a communications coordinator, and a helping professor/teacher. The main coordinator is responsible for task distribution within his/her team and for solving the daily problems that arise. He/she also acts as the main point of contact for the team, and is responsible for the continuity of the Initiative at their institution. The data coordinator is responsible for the technical data and the subsystem sheets in the SSETI Design Model (SDM). The communications coordinator is responsible for publishing a weekly update on the Ultimate Bulletin Board (UBB), keeping the participant database current, and answering questions from other teams. The helping professors/teachers are dedicated university staff with significant technical knowledge, able to help students with technical questions.
CURRENT SSETI PARTICIPANTS

There are currently around 20 major European universities involved in the first SSETI project, namely the European Student Earth Orbiter (ESEO) micro-satellite. The following countries are part of ESEO: Switzerland, Spain, France, Italy, England, Ireland, Portugal, Sweden, Poland and Germany. The division of responsibilities across the various universities is as follows:

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>University</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structures &amp; Configuration</td>
<td>University of Porto</td>
<td>Portugal</td>
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<tr>
<td></td>
<td>University of Bilbao</td>
<td>Spain</td>
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<tr>
<td>Power</td>
<td>Naples University</td>
<td>Italy</td>
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<tr>
<td>Attitude Determination &amp; Control</td>
<td>Instituto Superior Técnico</td>
<td>Portugal</td>
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<tr>
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<td>Lulea University</td>
<td>Sweden</td>
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<td>Newcastle University</td>
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<td>Ollscoil Atha Cliath</td>
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<tr>
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<td>Manchester University</td>
<td>United Kingdom</td>
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<tr>
<td>Propulsion</td>
<td>Stuttgart University</td>
<td>Germany</td>
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<tr>
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<td></td>
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<td>Italy</td>
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<td>Risk Assessment</td>
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<tr>
<td>Public Relations</td>
<td>Hochschule Für Druck und Medien</td>
<td>Germany</td>
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<td>SSETI Design Model</td>
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<td>Switzerland</td>
</tr>
<tr>
<td>Legal Matters</td>
<td>University of Paris</td>
<td>Paris</td>
</tr>
</tbody>
</table>
ESEO

The European Student Earth Orbiter is currently in the design and development phase (so-called ‘Phase-B’). When launched at the end of 2004, it will be operated from a ground station in Portugal. The mission objectives are to:
– take images of Earth and the Moon to stimulate space education in Europe
– test and qualify a propulsion system for future lunar missions
– test and qualify a star tracker developed from a commercial device
– measure radiation onboard the spacecraft.

The benefits that are accruing to the participating students include:
– gaining hands-on experience in designing and developing spacecraft
– learning how a space project is carried out, what standards are applied and how ESA works
– participating in an international and interdisciplinary venture
– experiencing international and interdisciplinary teamwork with people from all over Europe
– interacting with ESA and industrial experts, and
– making several visits to ESTEC,
all of which contribute to making them better prepared engineers and scientists, who will hopefully continue to work in the European space environment in the future.

To the Moon and Beyond ……

SSETI is a unique platform for students in that it is extremely rare for young people to be given the responsibility for putting their theoretical expertise to use in a project where the outcome is a fully operational spacecraft. It provides them with the skills needed to cope successfully with the international and interdisciplinary approaches that are common in the European workplaces of today and tomorrow. It allows them to familiarise themselves with the European standards currently in place and the way in which a space project is carried out in industry. They are also faced with the task of writing high-quality documentation. Not least, all of the above needs to be done in parallel with their regular studies, teaching them to plan and prioritise.

The work so far completed on ESEO shows that, given the proper support, coordination and advice, the project will be a success, and most importantly a good example of what the European students of today can achieve through teamwork, and a combination of enthusiasm, motivation and hard work.

The goals for SSETI are not focused only on Earth-orbiting satellites, however, and there are already thoughts about student missions to the Moon and even beyond…… Let’s launch the dream! 🌕