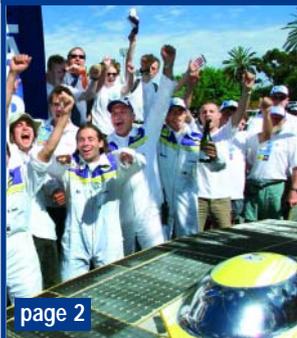


EDUnews

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Dear EDUnews Reader,

The idea of an education newsletter for the European Space Agency (ESA) has been around for quite some time. Now at last here it is. EDUnews is a newsletter devoted to educational themes and activities at ESA. There are many things going on – many interesting projects to learn about, many excellent people to get to know and many ideas to share and discuss. With EDUnews we have a dedicated publication in which all such information is collected.

The Newsletter is published with the support of the ESA Publications Division and it is co-ordinated by the ESA Education Office. Its content, however, is open to contributions from everybody involved in educational initiatives at ESA and beyond.

We hope to provide everybody who is interested in the subject of education in science and technology in general and space in particular with an informative and pleasant tool and a practical guide to the different initiatives and programmes. Help us make it grow and become more appealing and complete!

We hope you enjoy this first issue. We would be grateful if you would share your suggestions, criticisms, experience and ideas with us. Feel free to contact us at education@esa.int.



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A vision of the role of ESA in educating the European youth

Wubbo J. Ockels

Head of the Education Office,
ESA



Europe's strengths in the fields of science and technology are a major cornerstone for its success – commercially and culturally. More than ever, science and technology rely on competent and creative people.

The developments in the space sector, the new space perspective and space communication have made us Earth citizens more aware of our planet and led us to take responsibility for maintaining it as a healthy base for humanity. The capability to reach out beyond the limits of the Earth is a result of the careful development of the necessary sciences and technologies over many generations. This development would have failed if the transfer of knowledge and culture were not assured from generation to generation.

Space has become an integral part of our world. There are many satellites in space that serve us in the fields of communication, navigation, weather reports and search and rescue. Earth observation satellites, in particular ESA's large Envisat, will give us more and more insight into the delicate processes that drive the Earth and its inhabitants. The International Space Station forms the first human outpost circling the Earth. The Moon could be the next logical step. It could become our eighth continent, used for research into the origin of the Earth-Moon system, and for economic and environmentally clean launches into the Solar System. It could provide an undisturbed platform for astronomy and the exploitation of its valuable resources.

Eventually humankind will use space, its opportunities and its resources even better than it does now. New technologies will lead to unlimited person-to-person communication all across the globe, and robotics will allow for utilisation of the Moon, asteroids and maybe Mars.

Many of the problems facing us – like climatic change, pollution, lack of fresh

water, shortage of food production etc. – require sound scientific and technical know-how to find a solution. Space science and technology as tools to monitor the Earth and as the platform and on which new technologies such as solar power are developed form a significant part of the required know-how. Space is also a strong motivator, which can stimulate youngsters to learn and understand science and technology.

It is therefore a mandatory task of the European Space Agency to disseminate its information and to transfer its know-how especially to the young, the ones who shape our future. This task is also anchored in the Agency's Convention (article V).

Recently the Ministerial Council endorsed the Long-Term Space Policy Committee Report and asked the Agency to develop a coherent space education programme that involves significant numbers of the European youth at all age levels. The programme will cover a broad range of exciting and challenging activities, which hopefully will motivate the youngsters and prepare for their active participation in space science and technology projects. It will provide access to information on ESA, and we are investigating opportunities to include space in educational curricula.

However, space is not only interesting and exciting, but also a highly complex subject. To understand space one has to know physics, mathematics, chemistry, etc., subjects that are generally regarded as difficult. This should be seen as a strength rather than a weakness. An attitude should be stimulated in which the choice for the difficult is the preferred one. Just like a youngster who buys a computer game, or like President Kennedy's famous words at the beginning of the Apollo programme: "We don't do it because it is easy,



we do it because it is hard". And we will need excellent and challenging performances in space, because it becomes clearer that our world cannot and will not be confined to the limits of the Earth.

It is important that youngsters in general and European youngsters in particular acquire sufficient skills related to space to take the responsibility to develop and shape their 'space world' and share its benefits. The space culture has to become part of the space generation.

ESA has created a new Education Office for initiatives and projects that involve youngsters. It also provides a focus and co-ordination of the various education activities of the Agency. Its main goal is to reach out to a greater number of young Europeans to promote their interest and literacy in science and technology subjects in general and in space matters in particular.

The implementation of the Agency's Space Education programme will involve several European educational institutions and associations and other related organisations. We will also look for support from the industry and companies that appeal to young people.

Different activities are aimed at different age groups. While hands-on projects are the prime activities for attracting the attention of students, teachers form the prime focus for the secondary education. The development of games and toys seems to be an effective way to approach primary education. Also more formal activities are being developed which will result in bringing space into the curricula of schools and which will create bi-lateral relationships with universities.

Some highlights of today's activities and achievements are:

- A "Physics on Stage" festival for teachers. National steering committees from 22 countries select the most exciting teaching projects and the best teaching materials. Several hundreds of teachers are brought together in a festival where the excitement is shared and the practices are exchanged. The first festival took place at CERN in November 2000. The next will be at ESTEC in April 2002. This activity is a joint programme of ESO, CERN, ESA

and the European Commission for Research.

- Parabolic flight campaigns for European students are organised annually allowing some 120 students to experience weightlessness and perform their own experiments. The most promising experiments are invited to professional parabolic flights and maybe eventually the International Space Station.
- The pan-European students distributed design effort Student Space Exploration and Technology Initiative (SSETI) has been set up, using the internet and sophisticated simulation tools. Until now 20 universities and 600 students have actively joined in this design effort.
- A significant number of European students are given the opportunity to participate in the annual congress of the International Astronautical Federation (IAF), facilitating direct contact between science generations. In 1999 some 463 students participated in the congress in Amsterdam; in 2000, 100 European students went to Rio de Janeiro, in 2001 350 students participated in the congress in Toulouse.
- The ESA Member States have agreed to allocate 1% of the utilisation resources of the European part of the International Space Station to the youth.

The European Space Agency is certainly moving ahead and will continue to involve more youngsters in its programmes. A prerequisite for the success of all of the Agency's educational activities is that our target audience is aware of these activities. ESA is reaching out, and the external strategy and relations are essential for its success. A new element of this strategy is EDUnews.

I hope you like EDUnews, its concept and content, and I hope that you will take the opportunity to send us your comments and contributions.



Wubbo J. Ockels



The ESA Education Office



As evidence of the importance of educational activities for an organisation based on knowledge and its exploitation, the ESA Convention places education among its mandatory activities. This has driven ESA to pay more and more attention to the educational world and recently to reinforce its Education Office.

The Education Office, attached to the Department of Administrative Management and Education, is headed by **Wubbo J. Ockels**. The office is organised around three main axes: Projects, Primary and Secondary Education and Higher Education. Moreover, the ESA Education Office has responsibility for the overall coordination of all educational initiatives carried out within ESA by any Directorate.

The Education Office is a very dynamic group of young professionals dealing with a large number of educational projects. We will have the opportunity to touch upon all of them in the next issues of EDUnews. Have you ever heard of the IAF Outreach Programme? Are you wondering what POS stands for? Would you like to know more about Parabolic Flights? Check the next pages or wait for the next issue of EDUnews and you will get to know all you ever wanted to know about ESA Educational Projects but never dared to ask! Alternatively you can contact us at education@esa.int and we will put you in touch with the right person.

How to get primary and secondary schools, their teachers and their curricula closely connected to space-related matters is **Isabelle Duvaux-Béchon's** daily task, and she is doing it with great enthusiasm and motivation. She has also taken over the ESA internal co-ordination of the education team (or E-team, as we call it) and the development of the new ESA Education web site.

Piero Messina as "Mr University" is the main contact point for higher education. He is also responsible for such tasks as

relations with other institutions (e.g. the International Space University, ISU) and other education-related organisations (e.g. Eurisy). One of his main goals is to come up with a comprehensive and effective framework for ESA/University relations for educational purposes.

The Education Office, however, relies for all its projects on the valuable help of a team of young professionals:

Helen Wilson is coordinating, on the ESA side, the Physics on Stage programme and festival that will take place at ESTEC on April 2-6. She is also involved in making sure that events like these and the coordination with fellow organisations of the EIROFORUM (ESO, CERN, EMBL etc.) are enlarged and pursued in the future;

Nicole Sentse is in charge of the Student Parabolic Flight Campaign that will take place in Bordeaux next July;

Monica Miguel Lago has gone through the organisation of the IAF Congress Outreach programme for the IAF Congress held in Toulouse last year. She is now very busy developing material for kids using space and remote sensing (her speciality). She has passed the IAF Outreach Programme organisation over to

Caroline Pujol who will have the delicate task of organising the participation of some 200 European students to Houston for the World Space Congress;

Llierni Arana is looking after the SSETI virtual community, leading it through the transition from Phase A to Phase B and beyond;

Inaki Rodriguez Rebolledo has the double task of maintaining and fostering contacts with European Students' Organisations and organise the Foton opportunity for students;

José Sanchez Troncoso is our web and database person, a key element in our communication strategy!

Feel free to contact us at education@esa.int and we will get back to you!

Physics on Stage 2



What is Physics on Stage?

Physics on Stage is an initiative for European physics educators. It was originally set up by three of Europe's leading research organisations as part of the European Week for Science and Technology 2000.

Physics on Stage gives teachers from 22 European countries the opportunity to take part in national programmes and international festivals to exchange teaching methods and materials.

Why Physics?

Over the past decade, numbers of students and teachers in physics courses across Europe have fallen considerably. European citizens suffer from a low literacy level in physics and there has been a general decline in interest in science in our society.

Physics on Stage aims to find innovative and practical solutions to these problems by involving those who know best how to communicate the excitement of physics - the European teaching community.

How can I join in?

Contact your National Steering Committee! Visit your national website! Organise or take part in local and national activities!

To find out more about *Physics on Stage*, visit the website at <http://www.estec.esa.nl/outreach/pos>

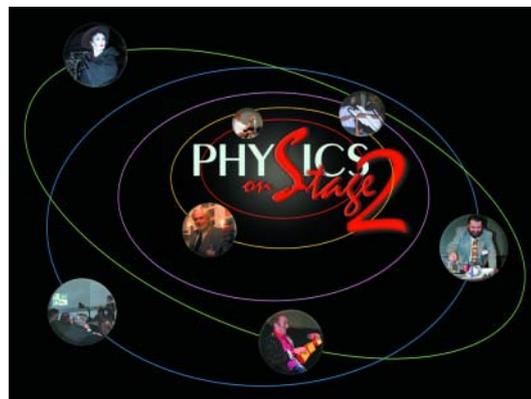
Events are taking place across Europe to identify the most motivated individuals and innovative projects in physics teaching. These will be brought together at the next *Physics on Stage* festival. Don't miss out!

The annual festival

The next *Physics on Stage* festival will take place on **2-6 April, 2002 at ESTEC in Noordwijk, the Netherlands**. The most interesting contributions from the national events will be invited to take part in a dynamic week of performances, presentations, workshops and fair sessions.



The countries involved are Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxemburg, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, and the United Kingdom.



Life in the Universe

The organisers of Physics on Stage collaborated again in 2001 on the project 'Life in the Universe'.



The Final Event of the 'Life in the Universe' competition took place at CERN in Geneva on 8-10 November, during the European Week of Science and Technology 2001.

The competition had been building up over the last six months, as hundreds of children, aged 14 to 18, from 22 European countries created their own individual work inspired by the theme of astrobiology. Competition entries were in two broad categories: scientific and artistic. Entries ranged from websites, essays and scientific papers, to poetry, paintings and theatre pieces. Winners were selected from each country to compete in the Super Contest at CERN in Geneva, Switzerland.



After three days of student presentations, group discussions and lectures from experts in the search for extraterrestrial life, the overall winners were chosen in a live webcast from CERN. In the scientific category, the Austrian team of Jan Stuller and Felix Ferdinand Mikl won a trip to ESA's Kourou Spaceport in French Guiana to see an Ariane-5 launch. Their project was a design proposal for a self-sustainable human settlement in space, called "Columbiat". The winners of the

artistic category were Adám Orbán, Mihály Kristóf and Katalin Lövei from Hungary, with their imaginative board game, "Entropoly". They won a trip to the ESO's Paranal Observatory in Chile.



Second prizes were awarded to Ricardo Moreno Luquero, Alberto Orejana Martin and Roberto Sanchez Garvin from Spain, for their project, 'Meteorites, Craters and Life in the Universe'; Edwin Kite from the United Kingdom for his investigation, 'Could Mars support advanced Life?'; Vitor Ferreira, Joao Dias, Cristiana Azevedo and Catia Lopes from Portugal for their theatrical performance, 'Science Please!', and Ivar Marthinusen from Norway for his essay 'The Caricon from Oxium'.

Everyone involved had a fantastic time and the enthusiasm and creativity of the young participants was very much appreciated by the team of European astrobiology experts who judged the entries.



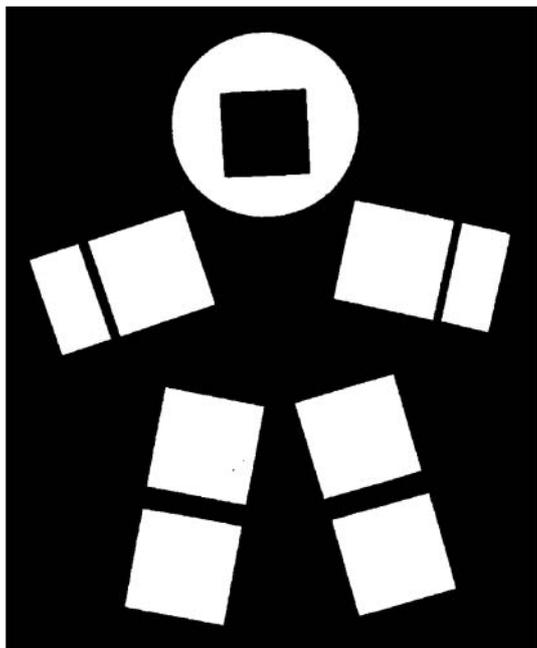
To find out more about Life in the Universe, visit the website at <http://www.lifeinuniverse.org>

"L'enfant du Cosmos" – The Space Child

Target group: Children in the last but one year of primary school in ESA Member States

Dates: Spring-Summer 2002

The project "L'enfant du Cosmos" or "Space Child", dreamt up by French artist Pierre Comte and proposed by the Aéro Club de France, will be an installation somewhere in Europe of the schematic figure of a child. This figure will be composed of 32000 white plastic squares, each measuring 80x80 cm.



Artwork: Pierre Comte

The schools participating will be selected with the help of the members of the Advisory Committee on Education (ACE), who will also take care of the translation of the documents provided with the information kits and the distribution of the material.

With each white square, every participating child will receive an educational kit explaining the project and the basics of Earth Observation from space, so that their involvement in the project is not only artistic, but also educational.

Planning:

- **November - December:** finding sponsors and defining children's space camps
- **November - March:** preparation of educational kits, translation, printing
- **February - March:** selection of the schools by Member States
- **April:** Member States send material to schools
- **May:** work in the schools
- **June:** return of the work to the installation location
- **1-15 July:** installation of the figure
- **15 July - 15 August:** figure in place for photographs, visits by journalists, visits by children
- **15-31 August:** dismantling of the figure
- **September:** sending of photographs to schools and post-project analysis in the schools

Each of the 32000 children will make an imprint of their two hands on the square and can draw inside them. Once the figure is installed, it will be photographed by helicopter, plane and satellites (SPOT for visible light and ERS or Envisat for radar image). For these radar images, radar reflectors will be installed around the figure so that it can be clearly located from space.

Once the figure is in place, the plan is to invite groups of children to the site for a few days to carry out space activities.

The Education Office and Earth Observation Directorate of ESA are supporting the project with three main actions:

- Helping to extend the target group to children from all Member States
- Designing the educational kit for the children
- Providing images of the child taken by ERS/Envisat

For any question concerning education and ESA, you can send a message to education@esa.int.

SSETI (Student Space Exploration & Technology Initiative)

The Student Space Exploration and Technology Initiative (SSETI) is a project of ESA's Education Office. The main objective is to create a network of students, educational institutions and organisations

via the Internet who will manage the distributed design, construction and launch of micro-satellites – and potentially more complex projects such as a Moon orbiter or lander.

15 European countries are actively involved in SSETI.



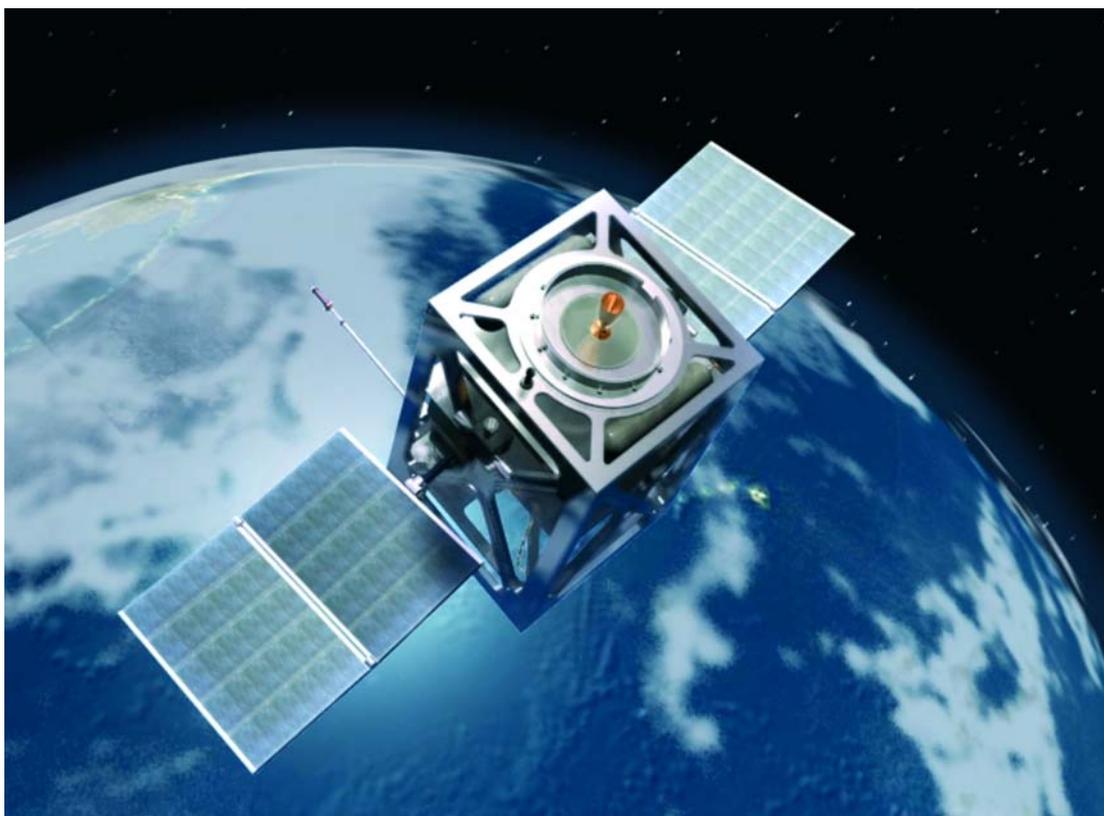
Last year, the development of the communications infrastructure for the project and the Phase-A study of the first SSETI micro-satellite were completed.

This first SSETI micro-satellite, which does not have a name yet, is expected to

be launched around April 2003 into geostationary transfer orbit (GTO) as a piggy-back on an Ariane-5. Once in GTO, it will remain there for 28 days and perform simple science experiments, while outreach activities will go on down on Earth. Payloads for the satellite include cameras, a star tracker, a radfet experiment and a cold gas propulsion system.

The many European students involved in this ambitious project are due to embark in its Phase-B, which is the detailed design of the satellite. The satellite itself will actually be built in Phase-C/D. Phase-E will see the launch and operations of the satellite, and Phase-F the ultimate disposal of it.

For more information,
visit the websites
<http://www.estec.esa.nl/outreach/SSETI>
or
<http://www.sseti.net>



52nd IAF Congress, Toulouse 2001



The lucky prize winners were Stephanie de la Sayette and Abul Bashar Nuruzzaman, who both received a trip to Kourou to watch an Ariane launch, and Johan Andersson and Erwan Mazarico, who will attend next year's World Space Congress in Houston.

The Supporting Team Members, the winner of the logo competition organised by the ESA Education Office and two students from TU-Delft, were also awarded prizes during the lively students' night.

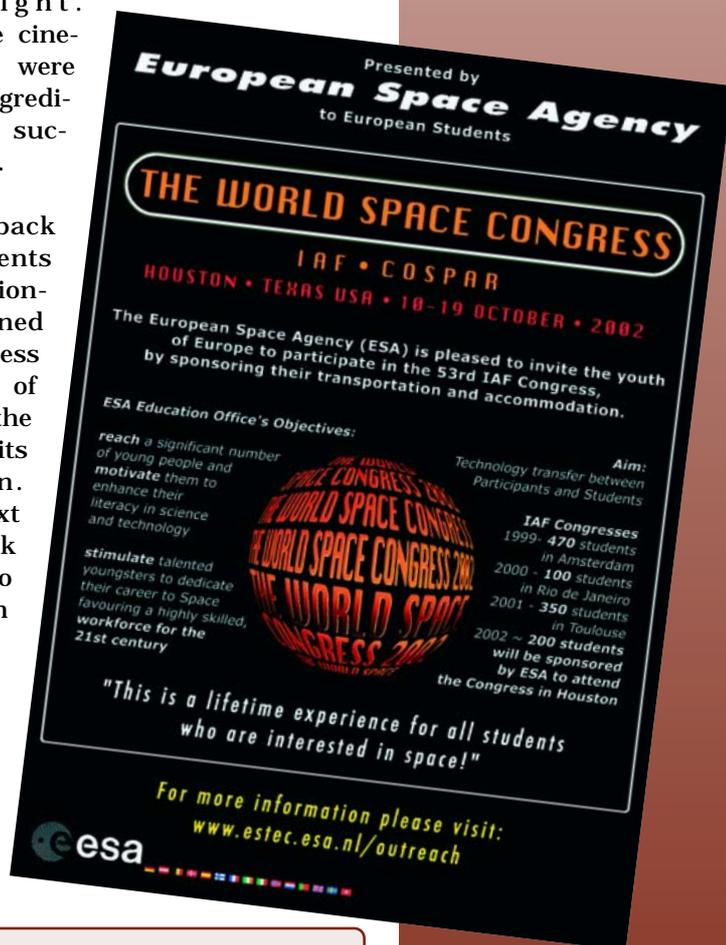
The Student Outreach at the International Astronautical Federation (IAF) Congress in Toulouse was a great success. Almost 300 European students from all ESA Member States were sponsored to participate in this year's IAF. During the Congress, a wide range of subjects were presented under the theme "Meeting the Needs of the New Millennium". It was extremely interesting for the students to mingle with professionals and listen to their views on space in the future and this also kept the element of youthful energy in the Congress Rooms.

Another 120 students from local universities, ISU and NASDA Programme were also involved in the Outreach Programme. It gave them the opportunity to exchange ideas during the technical sessions and at the Student Stand, also called the "Student Exchange Square", where they could present their final projects, theses, science presentations or the activities of their university, college, project or club to the assembled space professionals from around the globe!

The interest and enthusiasm that the students demonstrated throughout the Congress were rewarded with prizes at a special social event. The prizes were drawn by Wubbo Ockels, Head of the ESA Education Office.

Music, space cinema and fun were the main ingredients of this successful event.

The feedback from students and professionals underlined the effectiveness of this type of activity and the necessity of its continuation. And for next year...we look forward to seeing you in Houston!



For more information,
visit the website at
[http://www.estec.esa.nl/outreach/
home.html](http://www.estec.esa.nl/outreach/home.html)

ESA Student Parabolic Flight Campaign



Throughout nearly 40 years of manned space flight, relatively few astronauts and cosmonauts have been privileged and lucky enough to experience weightlessness in space.

The International Space Station will give us a large permanent weightlessness laboratory in space for the next decades, and we want students to be actively involved.

What is the ESA Student Parabolic Flight Campaign?

After the successful student parabolic flight campaigns held in 1994 and 1995, ESA has resumed its organisation of parabolic flight campaigns dedicated to students on an annual basis.



Four parabolic flight campaigns have already flown, and we are now waiting for applications for the 2002 student parabolic flight campaign, which will take place from Bordeaux-Merignac airport in France.

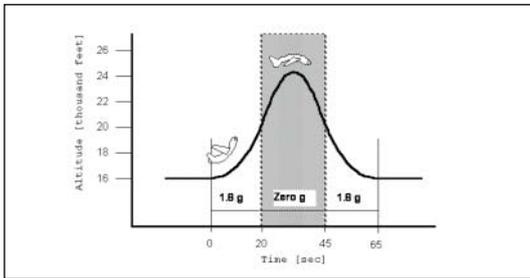
30 experiments will be selected to fly in this campaign using the criteria of originality, demonstration of 0g, technical complexity and outreach performed by the team. Each experiment team consists of four students. Each experiment will fly twice, accompanied by two students at a time so every team member will get to fly once.



This is the chance for students to experience real weightlessness first hand on board of the A300 ZERO-G aircraft during the summer holidays. In addition, for one or two of the very best student experiments from each campaign, there will be the possibility to re-fly their experiment on one of ESA's Professional Parabolic Flight Campaigns.

What is Parabolic Flight?

In parabolic flight, the aircraft is put into a sub-orbital trajectory that provides free-fall, or weightlessness. Each manoeuvre begins by having the aircraft perform an aerobatic manoeuvre, which starts from level flight, and pitches up to approxi-



mately 45 degrees nose-high and wings level, subjecting the passengers to a 2-g pull up lasting about twenty seconds. After that, the aircraft engines are powered back and the plane is launched into the same parabolic trajectory that a ball would follow, providing everyone inside with around twenty seconds of total weightlessness for experimentation purposes. At the bottom of the parabola, the aircraft slowly pulls out of its dive and levels off for the next arc, restoring weight to those in the cabin.

Feel free, feel 0-g!



The 2002 campaign will take place from 10 to 26 July in Bordeaux, France.

More information can be found on <http://www.estec.esa.nl/outreach/parabollic>

What is ESA?

The European Space Agency is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the people of Europe.

ESA has 15 Member States: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Canada has special status and participates in some projects under a cooperation agreement. By coordinating the financial and intellectual resources of its members, ESA can undertake programmes and activities far beyond the scope of any single European country. ESA is an entirely independent organisation although it maintains close ties with the European Union with whom it shares a joint space strategy.

ESA's job is to draw up the European space plan and carry it through. The Agency's projects are designed to find out more about the Earth, its immediate space environment, the solar system and the Universe, as well as to develop satellite-based technologies and promote European industries. ESA also works closely with space organisations outside Europe to share the benefits of space with the whole of mankind.

ESA has its headquarters in Paris and it is here that future projects are decided upon. However, ESA also has centres throughout Europe, each of which has different responsibilities.

- ESTEC, the European Space Research and Technology Centre, is the design hub for most ESA spacecraft and is situated in Noordwijk, the Netherlands.
- ESOC, the European Space Operations Centre responsible for controlling ESA satellites in orbit, is in Darmstadt, Germany.
- EAC, the European Astronaut Centre, trains astronauts for future missions and is situated in Cologne, Germany.
- ESRIN, the European Space Research Institute, is situated in Frascati, near Rome in Italy. Its responsibilities include collecting, storing and distributing satellite data to ESA's partners and acting as the Agency's information technology centre.

In addition, ESA has liaison offices in the United States, Russia and Belgium, a launch base in French Guiana, and ground and tracking stations in various parts of the world.

ESA's mandatory activities (space science programmes and the general budget) are funded by a financial contribution from all the Agency's Member States, calculated in accordance with each country's gross national product. In addition, ESA conducts a number of optional programmes. Each country decides in which optional programme it wishes to participate and the amount of its contribution.

What's coming up:

The Space Station Design Workshop will be hosted at ESTEC from 17 to 23 February. Deadline for application: December 31, 2001. More information is available at: <http://www.estec.esa.nl/outreach/SSDW/>.

The final event of **Physics on Stage 2** will be hosted at ESTEC from 2 to 6 April 2002. Check the URL <http://www.estec.esa.nl/outreach/pos/pos2.htm> and look for your national point of contact.

The 5th Student Parabolic Flight Campaign will take place in Bordeaux, France, in July 2002. More information at: <http://www.estec.esa.nl/outreach/parabollic/>.

The ESA Education Office is supporting the **World Space Week** that will take place from 4 to 10 October 2002. More information at: <http://www.spaceweek.org/>.

ESA is inviting European students to the **World Space Congress** in Houston, Texas, USA from 10 to 19 October 2002. For more information and application please visit <http://www.estec.esa.nl/outreach/iaf/>

If you would like to sign up for or inform us about a specific event please send an e-mail to education@esa.int



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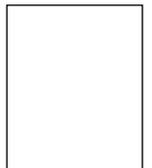
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