

The International Astronautical Federation and the International Academy of  
Astronautics

**IAF/IAA/ISU/UNESCO Expert Workshop  
“Bridging Space and Education”**

Paris, 13-15 March 2003

**Proceedings**

**Hosted by:**  
UNESCO

**In co-operation with:**  
International Space University

**Sponsored by:**  
European Space Agency

**IAF/IAA/ISU/UNESCO Expert Workshop**  
**« Bridging Space and Education »**  
At UNESCO in Paris, 13-15 March 2003

**The bureau of the organizing committee:**

- François Becker, Dean and Vice president of International Space University, Chair of the Study Group of the IAA on "Bridging Space and Education",
- Karl Doetsch, President of International Space University and Chair of the Scientific and Technical subcommittee of the COPUOS,
- Philippe Willekens, ESA Education Office and Chair of the IAF Space Education Committee
- Pierre-Louis Contreras, Head of the Communication and Education CNES, member of the IAF Space and Education Committee
- Yolanda Berenguer, Space Education Project, UNESCO
- George Haskell, member of the IAA study group "Bridging Space and Education"
- Micaela Bracciaferri, Secretariat of the organizing committee, ESA Education Office  
(Tél: 33 1 53 69 7355 Fax: 33 1 53 69 7601 Email: [micaela.bracciaferri@esa.int](mailto:micaela.bracciaferri@esa.int))

These proceedings, edited by the bureau of the organizing committee, have been reviewed by the participants to the workshop.

**IAF/IAA/ISU/UNESCO Expert Workshop**  
**« Bridging Space and Education »**  
At UNESCO in Paris, 13-15 March 2003

**1. Scope of the Workshop**

1. Space is questioning and inspiring humanity since its origin. It is a fundamental topic of research and interest for humankind. Thanks to the scientific and technical progress achieved in the past century, Space is not only a topic of research and a subject of enlightenment, but also a place to perform research, and a tool that allows key activities on Earth. Space and Space related activities are part of our daily life. They belong to the culture of humankind, and as such, they have to be part of the education of all children. Space has to be more and more introduced in education: **Space in education** is the first aspect in bridging space and education
2. Furthermore, the maintenance and the development of Space research and space related activities for the benefit of humankind need the active work of enthusiast and motivated people who have to be properly educated. How to provide the most appropriate education for those who will become the professionals in Space and Space related activities is a key question to be looked at carefully: **Education in Space** is the second aspect in bridging space and education.
3. Last, but not least, Space is providing unique tools to improve education, such as Tele-education, via satellites, pedagogical material, etc: **Space: a tool for education** is the third aspect of bridging space and education.

Education in Space, Space in Education and Space for Education are the three components of the cross feeding between Space and Education. Although these three components are linked and enriched by each other, this workshop will focus on

**“Space in Education, in the last few years of secondary education”**

**2. Goals and Rationale of the workshop**

The three above components of Space and Education have already been addressed in several conferences, symposiums and workshops in most countries during the last years. They have been subject of several recommendations of UNISPACE III (see <http://www.oosa.unvienna.org/unisp-3/index.html>) and of the Space Generation Forum (SGF). These recommendations have been worked out by several committees, and particularly by the Action Team 17 on Capacity Building and Action Team 18 on Awareness Raising of the Committee for the Peaceful Uses of Outer Space of UN (COPUOS) and the subsequent SGF meetings. An important material has thus been prepared, experiences have been conducted and lessons have been learned in most countries of the world.

It is timely to gather all what has been done and to give the opportunity to those who contributed to enhance the interactions between Space and Education to meet together, to share their experience, to identify the most promising experience and to prepare an action plan for the future.

The goals of this workshop are precisely:

- 1) To evaluate and prepare a synthesis of what has been done in the past on the three aspects of the interactions between Space and Education,

- 2) Based on this synthesis, to identify key points, successful experience, success stories, pilot projects regarding the introduction of Space in Education in the last few years of secondary education, as a subject of study and best practices, as an illustration of the concepts presented in most disciplines and as a stimulation for international opening and for study in general;
- 3) To prepare a series of recommendations and an action plan for improving the introduction of Space in Education in the last few years of secondary education;
- 4) To prepare elements of a high-level Agreement regarding the introduction of Space in Education to be submitted to UNESCO in preparation of a document addressed to the relevant authorities in all the countries of the world;
- 5) To prepare a contribution to a plenary session for the next International Astronautical Congress which will be held in Bremen in October 2003, as well as for an information session during UNESCO's General Conference to be held in Paris in October 2003.

### **3. Documents for the workshop and follow-up**

#### **Preparation of the work**

In order to fulfill the above goals, special Information sheets have been prepared and distributed to all participants. They have been reviewed and presented in a synthetic way to feed the work of the workshop.

#### **Proceedings and Publication**

The material presented in the data sheets, and during the workshop as well as the conclusions will be subject to a report that will be submitted to the International Academy of Astronautics for review and endorsement for publication.

### **4. Plenary Session 1 (13 March 14h00)**

#### **Introductory Lectures**

- Welcome Address by M. Barbosa, Deputy Director General of UNESCO
- "Progress in implementing UNISPACE III recommendations on Education" by K. Doetsch, President of the International Space University and Chairman of the Scientific and Technical subcommittee of the COPUOS
- "Progress from Action team 17 (Capacity Building) of UNISPACE III" by Mr. T. Oida, NASDA Bonn Office.

#### **General Workshop Plans**

- Presentation by F. Becker (IAA) and Ph. Willekens (IAF)
  - Introduction
  - Objectives
  - Workplan

**Welcome Address**  
**by**  
**Dr M. BARBOSA**  
**Deputy Director General of UNESCO, Paris**

Distinguished participants,  
Dear friends and colleagues,  
Ladies and Gentlemen,

Let me welcome you to UNESCO and to this workshop on “Bridging Space and Education”. I am particularly pleased to do so because, with my two “hats” – that of UNESCO and that of the International Astronautical Federation – I feel I am a kind of a “bridge” myself.

First of all, I would like to express UNESCO’s appreciation to the other co-organizers of this workshop - the International Academy of Astronautics, the International Space University and, of course, IAF, represented here by my distinguished friends and colleagues, as well as to ESA for its support.

This brings me to the first and, I believe, already secured outcome of this workshop: its preparation and holding in themselves represent a concrete contribution to bridging two communities: one advancing and promoting space exploration and the other developing education worldwide. This is very important because, before building any “bridge”, one must bring together the “builders”.

As the specialized agency of the United Nations system for education, UNESCO covers all forms, levels and types of education. Following the World Education Forum in Dakar in April 2000, our main priority today is coordinating the global drive towards achieving Education for All by 2015. However, education cannot stop at the basic level, because that would not be enough for the progress or even sustainability of humankind.

Therefore, UNESCO continues its tradition of work in science education and will be leading, in particular, worldwide efforts related to the UN Decade on Education for Sustainable Development starting in 2005.

Furthermore, drawing upon its other fields of competence – the sciences, culture and communication - UNESCO has the comparative advantage of multidisciplinary design and delivery capacity, which are instrumental for addressing the complex challenges of today’s world.

On the eve of the 21<sup>st</sup> century, in 1999, UNESCO organized the **World Conference on Science** in Budapest, in cooperation with the International Council of Scientific Unions (ICSU). The Conference’s aims were to assess the status of science and technology worldwide, in terms of national policies, development plans, career perspectives, and educational opportunities, and to identify the needs and demands of stakeholders such as scientific communities, educational institutions, governments and civil society.

With regard to education in particular, there was a resounding call from the participants for the improvement of science education at all levels, for new curricula and teaching methodologies in response to the changing educational needs of societies, and for an increase of public awareness. The motivation behind this call had two main aspects. First, there is a pressing need to equip all young people and adults, male and female alike, with the scientific knowledge and skills required for the world of the 21<sup>st</sup> century. And, second, it is vital that we stop and reverse the decline in interest of students in general in science and technology.

UNESCO responded to this call in 2000-2001 by developing an **Integrated Plan of Action for Science and Technology Education**. One of its principal objectives is the improvement of the quality of education through diversification of contents and methods. The

Plan concentrates on building national capacities by improving educational materials and teacher training, and seeks to assist Member States in developing coherent programmes, focused on innovative science and technology teaching methods.

This is where space has a key and unique role to play. It can provide both inspiring content and innovative tools to education. In other words, it can provide young people with a dream and the means to advance towards it, and then, in its turn, profit from the intellect and energy of those it has inspired.

It is in this context that the **Space Education Project (SEP)** was developed and launched in 2002. Driven by the need for improvement and innovation, the SEP aims at introducing space-related subjects at the secondary level in schools in developing countries, both informally and as part of formal education. It also seeks to integrate these subjects into national curricula, with due respect to the technological capacity and cultural diversity of the country.

Emphasis is given to including space education in the final two years of secondary education. This is a time when young people find themselves at a crossroads in their lives and when study and career choices affecting their future are made. You, the participants of this workshop today, are helping to define some of the options that young people may choose for themselves. Your work and guidance will help foster the next generation of space professionals – such as robotics engineers, structural designers, aerospace engineers and astronauts.

Given the speed and impact of today's scientific and technological change, education has no choice but to keep pace and to adapt itself to the transformations taking place. The theme of 'bridging space and education' fits into this framework, and the three dimensions of 'space in education', 'education in space' and 'space as a tool of education' provide useful ways of organizing our thoughts on these matters. This workshop is a timely opportunity to share experience and to identify promising ways forward, including recommendations and plans of action that may be pursued.

The forthcoming session of the General Conference of UNESCO and the next International Astronautical Congress in Bremen, both scheduled for October 2003, are forums where the results of today's workshop and similar events should be brought to the attention of decision-makers. By combining the advantages of such high-level events with grassroots approaches and direct methods, fresh impetus will be given to our common objectives, notably, the preparation of the next generation of members of the space workforce, and integrating 'space and education' within the larger context of education for sustainable development.

A new contract between science and society is being fashioned, and each of us is a signatory to this contract. The main "deliverable" of this contract is ensuring that the Earth and outer space provide a safe and sustainable environment to live in. And we must educate humankind into an awareness of the responsibilities this implies for all of us.

UNESCO is a relatively small organization. Its outreach and impact depend on its capacity to mobilize professional communities and to build partnerships. I hope that this particular partnership will grow stronger with every passing year, breeding daring ideas and innovative approaches and techniques for the benefit of both space exploration and education.

I wish you every success in your deliberations and look forward to the outcomes of the workshop.

Thank you.

**Implementation of Unispace III Recommendations :**  
**Progress made by Action Teams**  
by  
**K. Doetsch**  
**Chairman, Scientific and Technical Subcommittee, COPUOS**  
**President, International Space University**

**Statements from Space Policy Summit, Houston, Oct. 2002**

**Education and outreach were dominant crosscutting issues for summiteers**

- Space excites, inspires and motivates young to
- Study Mathematics and Science
- Compete for space experiments
- Space workforce is at risk
- US universities now graduate 75% of engineers graduated in 1980's
- Jobs must be available at end of studies
- Education and training expand user communities
- Outreach and communications need improvement

**Composition of UN Committee on the Peaceful Uses of Outer Space**

**UNISPACE III**

- Vienna, June 1999
- 33 recommendations for action on space activity related to bringing benefits on earth under general headings:
  - Protection of the Earth's Environment and Management of its Resources
  - Space Applications for Human Security, Development and Welfare
  - Advance Scientific Knowledge of Space and Protection of the Space Environment
  - Enhance space education, training and public awareness
  - Strengthen space activities in the UN system
  - Promote International Cooperation

**Implementation of recommendations**

- Prioritize recommendations
- Established inclusive multi-national action teams to pursue 6 highest priority actions plus 5 others.
- Government and non-government enterprises eligible for participation in teams
- Activity coordinated through UN COPOUS
- Progress Report to UN General Assembly in 2004

**Recommendations assigned highest priority**

- Develop a comprehensive, worldwide environmental monitoring strategy
- Improve the management of Earth's natural resources
- Implement an integrated, global system to manage natural disaster mitigation, relief and prevention efforts
- Improve universal access to and compatibility of space-based navigation and positioning systems
- Promote sustainable development by applying results of space research
- Increase awareness among decision makers and the general public of the importance of space activities

**Other Action priority recommendations**

- Enhance weather and climate forecasting
- Improve public health services
- Improve the international coordination of activities related to near-Earth objects
- **Enhance capacity building by developing human and budgetary resources**
- Identify new and innovative sources of financing to support the implementation of UNISPACE III recommendation

**Enhancing education and training opportunities and ensuring public awareness of the importance of space activities: action should be taken:**

(i) To enhance capacity-building through the development of human and budgetary resources, the training and professional development of teachers, the exchange of teaching methods, materials and experience and the development of infrastructure and policy regulations;

(ii) To increase awareness among decision makers and the general public of the importance of peaceful space activities for improving the common economic and social welfare of humanity;

(iii) To establish and/or strengthen national mechanisms to coordinate the appropriate development of space activities and foster the participation of all the sectors concerned;

(iv) To improve the sharing of information on and use of spin-offs from space activities, in particular between developed and developing countries, by making use of appropriate communications technologies;

(v) To encourage all States to provide their children and youth, especially females, through appropriate educational programmes, with opportunities to learn more about space science and technology and their importance to human development and to participate fully in activities related to space science and technology, as an investment in the future;

(vi) To create, within the framework of the Committee on the Peaceful Uses of Outer Space, a consultative mechanism to facilitate the continued participation of young people from all over the world, especially young people from developing countries and young women, in cooperative space-related activities;

(vii) To consider the creation of awards to recognize outstanding contributions in space activity, in particular for youth;

**Specific Action Teams established to Enhance Space Education, Training and Public**

**Awareness**

Increase awareness among decision makers and the general public of the importance of peaceful space activities for improving the common economic and social welfare of humanity;

Enhance capacity-building through the development of human and budgetary resources, the training and professional development of teachers, the exchange of teaching methods, materials and experience and the development of infrastructure and policy regulations;

**General Approach**

Establish multi-national action teams working through nationally managed coordination secretariats. Activity is resourced by participants.

a) **Assessment phase**

- Identify status quo
- Recommend specific activities for implementation
- Identify partners for implementation
- Develop implementation plan
- Report regularly to COPOUS through S&T committee

b) **Implementation Phase**

- Build on existing activities and competences
- Establish implementation partnerships
- Establish management, roles and resources
- Coordinate implementation actions
- Report to COPUOS through S&T subcommittee

**Overall Schedule**

- Assessment Phase
- First reports to S&T subcommittee Feb. 2003
- Implementation Phase
- Ongoing, starting 2003
- Major Report
- Report progress to UN General Assembly in fall 2004



### **February 2003**

The Scientific and Technical Subcommittee at its fortieth session:

- Reviewed reports and recommendations submitted by action teams;
- Reviewed outcome of the World Summit on Sustainable Development
- Reviewed results of other specific events that had relevance to the implementation of the recommendations of UNISPACE III
- Reviewed the contributions to be submitted by the United Nations system and intergovernmental and non-governmental organizations having observer status with the Committee
- Compiled contributions and recommendations for consideration by the Working Group of the Committee.

### **March/April 2003**

The Legal Subcommittee at its forty-second session

- to prepare its initial contributions to the report

### **June 2003**

The Working Group of the Committee at its forty-sixth session:

- To review additional reports and recommendations to be submitted by action teams after the fortieth session of the Scientific and Technical Subcommittee, in 2003;
- To review the recommendations of the Scientific and Technical Subcommittee;
- To finalize the outline of the report to the General Assembly and refine the timetable as necessary.

### **February 2004**

The Scientific and Technical Subcommittee at its forty-first session:

- To review the final reports and recommendations of all action teams;
- To prepare its final contributions to the report to the General Assembly for consideration by the Working Group of the Committee;
- To review the results of the first phase of the World Summit on the Information Society, the General Conference of UNESCO and other conferences held in the United Nations system that have relevance to the implementation of the recommendations of UNISPACE III and have not yet been reviewed;
- To compile contributions and recommendations for consideration by the Working Group of the Committee.

### **March/April 2004**

The Legal Subcommittee at its forty-third session

- To prepare its final contributions to the report to the General Assembly for consideration by the Working Group of the Committee

### **June 2004**

COPUOS at its forty-seventh session

- The Working Group of the Committee to finalize the report to the General Assembly;
- The Committee to endorse the report prepared by the Working Group of the Committee.
- October 2004
- Report to UN General Assembly

### **Conclusion**

- Unispace III actions can have a major influence on the international coordinated pursuit of global space activity for the benefit of all
- Enhancing capacity building is actioned and underway
- Process is inclusive
- Process of assessment and implementation is open for participation by non - Government as well as Government entities

**UN/COPUOS**  
**Report from Action Team No.17 (Capacity-Building)**  
by  
**Dr. T. Oida,**  
**Director, National Space Development Agency of Japan (NASDA)**  
**Bonn Office**

**Oida.Toshihiko@nasda.go.jp**  
**Tel. +49-228-914350 FAX +49-228-9112150**

**Vienna Declaration(1999)** As a UNISPACE III Action Team

- To enhance capacity-building through
- The development of human and budgetary resources
- The training and professional development of teachers
- The exchange of teaching methods, materials and experience
- The development of infrastructure and policy regulations

**23 Member Countries**

Argentina, Azerbaijan, Bolivia, Brazil, Canada, Columbia, Egypt, France, Hungary, India, Iran, Japan (Chair), Kazakhstan, Lebanon, Morocco, Nigeria, Pakistan, Peru, Philippines, Portugal, Saudi Arabia, Syrian Arab Republic, United States of America

**7 Member Organizations**

Committee on Space Research (COSPAR), European Space Agency (ESA), Economic and Social Commission for Asia and the Pacific (ESCAP), International Astronomical Union (IAU), Manila Observatory, Space Generation Advisory Council (SGAC), United Nations Educational, Scientific and Cultural Organization (UNESCO)

**Other Contributions**

China, Cuba, International Space University (ISU), National Space Society

**Coordination Meetings**

- #1 March 1, 2002 Vienna UN
- #2 June 4, 2002 Vienna UN
- #3 June 10, 2002 Vienna UN
- #4 October 17, 2002 Houston, USA
- #5 February 21, 2003 Vienna UN
- #6 February 26, 2003 Vienna UN
- #7 June TBD, 2003 Vienna UN

**Houston Forum for Capacity-Building**

15 October 2002, USA. Participants of 52 persons, 17 countries and 7 organizations  
Devoted support by ESA, UN/OOSA and many young experts from SGAC

- ESA'S current activities and the future plans for capacity-building
- Newly launched "Space Education Project (SEP)" by UNESCO
- The GLOBE (Global Learning and Observations to Benefit the Environment) Program
- IAU's activities on astronomy education
- AIT(Asian Institute of Technology, Thailand) activities for training Asian countries
- Activities in the regional Center for space science and technology education in Asia and Pacific
- SGAC(Space Generation Advisory Council) activities and future planning for capacity building

### **Questionnaire (by April 11)**

- Important tool to collect inputs to the "Drafting Team"
- Collect diversified inputs
- Open to anybody
- Response expected especially from:
  - Experts on "Capacity-Building"
  - People in various regions for specific aspects
  - From space-faring to developing countries
  - Different targeted trainees
  - From students to experts
  - Various fields/areas (remote sensing, navigation, etc..)

### **Overview of Existing Capabilities for Capacity-Building**

- Government Functions
- UN, International Organizations
- Space Agencies, Research Centers
- Regional Centers
- Symposium / Seminars
- Training Opportunities
- University Professors Fellowships, Space Experts, Teachers, Engineers/Scientists, Students, Children etc.
- International Cooperation
- Web Sites

### **Ideas for Capacity-Building**

- Global TV/Radio Broadcasting for Capacity-Building → Overcome "Digital Divide"
- Space Dictionaries in 16 Languages → Overcome language barrier
- Global Education Database → Increase accessibility to the opportunities

### **Recommendations**

Important Suggestions/Key Words for further discussions

- Shorten the gap between the space-faring countries and the developing countries
- Effective use of existing infrastructure
- Cooperation with UN regional Centers/Organizations
- Knowledge for Earth Observation Data
- Effective teaching methods according to the level
- Lessons from successful/unsuccessful experiences

### **Milestone**

By April 11, 2003	Continue Collecting Information by Questionnaire
By June, 2003 @TBD	Drafting Team Meetings
June TBD, 2003 @Vienna	Coordination Meeting #7
	-Intensive discussion on the Recommendations
	-Making clear message
	-Finalizing the report
February TBD, 2004	Recommendations to COPUOS
Autumn TBD, 2004	Recommendations to UN General Assembly #59

### **Summary**

- Action Team is accelerating its activity for consolidating clear and strong message
- Cooperation with existing capacity-building bodies or experts increase the value of the product.
- Any contribution by any organizations or any experts is welcome.

**Web Sites/Contact**

Team Web (sponsored by NASDA Bonn)  
<http://www.bonnooffice2002.org/UN/>  
Latest Draft Team Report  
Questionnaires

**Houston Forum Web for Capacity Building**

(UN OOSA Web, created by Mr. Kota Tanabe)  
[http://www.oosa.unvienna.org/unisp-3/followup/action\\_team\\_17/houston2002/](http://www.oosa.unvienna.org/unisp-3/followup/action_team_17/houston2002/)  
Forum Presentations  
Discussions

Team Contact (Team Chair)  
Mr. Takuya Okamoto (MEXT/Japan)  
[t3okamo@mext.go.jp](mailto:t3okamo@mext.go.jp) (Main)  
[tokamoto@rapid.ocn.ne.jp](mailto:tokamoto@rapid.ocn.ne.jp) (Backup)

**Comments from participants**

Participants asked what happens if someone wants to be involved in Action team 17 with projects on developing Countries and what kind of support can be expected. Action team 17 is open to new ideas: once approved, they can be implemented according to the level of commitment of Governments. However by mid 2003 a major report will be published by UNESCO on capacity building, and it will help understand the direction the Action Team 17 is going to.

**Introduction, Objectives and Work plan of the Expert Workshop**  
**F. Becker**  
**Dean, International Space University, IAA Study Group Chairman**  
**Ph. Willekens**  
**ESA Education Projects and Chair IAF Space Education and Outreach**  
**Committee**

**Space is questioning and inspiring humanity since its origin. It is a subject of enlightenment**

- Space is the origin of humankind and its environment
- Space is a tool that allows key activities for our daily life on Earth. Space is therefore part of the common heritage of Humankind. It belongs to our common culture.
- As such, it has to be part of the education of all children

**Space is interesting/exciting/stimulating for young people.**

- It is very efficient to support and maintain the passion of Youth for education in most disciplines and science in particular.
- As such, space has to be used as pedagogical example in teaching most of disciplines from 6 to 18

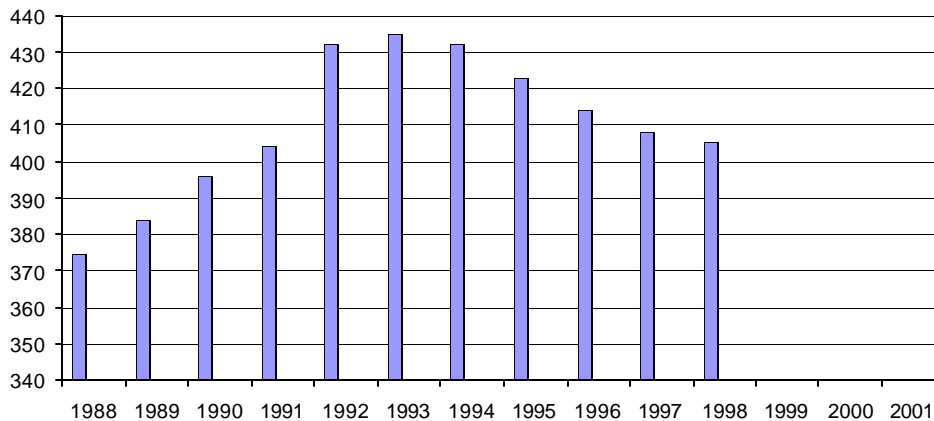
**Space in Education is the first pillar of the bridge between space and education**  
Maintenance and development of space related activities for the benefit of humankind need the active work of enthusiast and motivated people

**Space Sector needs to hire about 12,000 persons each year,**  
But

- Young people are more and more interested by the Net-economy
- Space is moving from an age of enthusiasm to an age of business,
- Space is no longer the most challenging sector to work in

**- Decline of interest in Science & Technology (cf. US example)**

US Master's degrees in Science and Engineering; range from 375,000 to 435,000, and then declines to about 400,0 in 1998.



This is true for many other countries and Europe in particular

**Appropriate and stimulating education of the future Professionals in space is a key issue:**

- Make Space Education more attractive
- Support the efforts of developing countries to introduce Space & uses of Space in their education programs
  
- Facilitate access to Space Studies & Activities
- Support Schools & Universities and youth organizations related to Space
- Implement recommendations on education of UNISPACE III, & subsequent symposiums and workshops.

**Education in Space is the second pillar of the bridge between space and education**

**Space is providing unique tools to improve education**

- Tele-education via satellites
- Pedagogical materials, data acquired by satellites
- Etc.

**Space, a tool for education is the third pillar of the bridge between space and education**

**Expected Output of this Workshop**

- Reports on the work of plenary and splinter sessions
- Synthesis on results of previous workshops and symposia
- Summary sheets classifying and evaluating experiences, projects and practices. At this end, Identify the appropriate category and provide examples in each of these categories and identify criteria for the evaluation of projects and experiences.
- Series of findings and recommendations with an action plan for introducing space in education
- Elements of a High level agreement
- Publication of the proceedings
- Publication of an article summarizing the process and the results

**Plenary Session 2 (13 March 16h00)**

**Review of recommendations and status of actions resulting from the past conferences and workshops by the IAA/IAF Study group and proposal of a classification of recommendations**

**Suggested classification of recommendations:**

- To promote **literacy** and enhance **rural education** by improving and coordinating educational programmes and satellite-related infrastructure;
  
- To enhance **capacity-building** through the development of human and budgetary resources, the training and professional development of teachers, the exchange of teaching methods, materials and experience and the development of infrastructure and policy regulations;
  
- To encourage all States to provide their children and youth, especially females, through appropriate educational programmes, with opportunities to **learn** more about space science and technology and their importance to human development and to **participate** fully in activities related to space science and technology, as an investment in the future.

### Unispace III, July 1999

- Bridging all **key players including** Industry, academia, space agencies, educational clubs and associations with youngsters and teachers to join efforts and to develop cooperative and coordinated actions in implementing the above recommendations
- Span space Education **across the ages** through all levels, including primary, secondary and higher education
- Enhance awareness and train **the teachers**,
- Develop pedagogical **materials and tools**
- Need to open **interdisciplinary** links between educational matters

### 02 World Workshops on Space and Education, 97-

**IAF Space and Education seminars and symposia**  
**Bridging space into Education, Strasbourg, April 2000**  
**SAF meeting, Rio, Oct 2000**

- Need to **reinforce** the relation between universities and industry  
**ISSAT Forum I and II, Toulouse, 98 and 2001**
- Need for a common **vision** that stimulates imagination and motivation of youngsters  
**Workshop on Workforce Development, Houston, 2002**

---

**Detailed Data Sheets on these events are given in Annex 1**

### Comments from participants

Analysing the past recommendations, the participants highlighted the need to have a common strategy on education. In order to give value to the work done a coherent implementation plan should be the outcome of the workshop.

The problem that Education is a no-revenue activity has always been an issue; some participants suggested a new recommendation: that Space Education community should have a closer liaison and coordination with industries.

### Preparing the way forward: examples of regional initiatives

- Bringing space to schools, UNESCO, Y. Berenguer
  - Building-up a Network of European Teachers, ESA Education Office, W. Ockels
  - Actions and lessons learnt in India, ISRO, Mukund Rao.
  - Latin American plans for the future, National Institute of Space research, INPE, T.M. Sausen.
-

**Bringing Space to Schools**  
by  
**Y. Berenguer**  
**Space Education Projects, UNESCO, Paris**

**Contents**

UNESCO is the United Nations Educational, Scientific & Cultural Organization

Where Education covers disciplines like:

- Natural Science
- Social Science
- Culture
- Communication

**FIVE FUNCTIONS**

- Laboratory of ideas
- Standard-setter
- Clearing house
- Capacity builder
- Catalyst for international cooperation

**SEP Recommendations of two world conferences:**

World Conference on Science, 1999, Budapest

- *Improve science education at all levels*
- *Develop new curricula and teaching methodologies*
- *Enhance professional development of science teachers and educators.*
- *Promote gender equality.*

UNISPACE-III, 1999, Vienna

- *Promote peaceful use and exploration of outer space*
- *Enhance education and training opportunities ensure public awareness of the importance of space activities*
- *Provide opportunities to young people to learn more about space science and technology and their importance to human security and development*

**OBJECTIVES OF SEP**

- To enhance Education on space subjects, and promote the integration of space subjects in the national education curricula, particularly in developing countries.
- To provide teacher-training programmes and learning opportunities to educators through workshops and seminars, and help them produce educational materials appropriate to their needs.
- To raise awareness of the general public about the benefits of space technology for the social, economic, cultural development of society.
- To encourage the participation and involvement of girls and women in space activities.
- To contribute to the preparation of the next generation of space workforce.

**COMPONENTS OF SEP**

Awareness Raising: Organization of contests, space events (World Space Week), school outings, e.g. space museums/observatories, science fiction movies.



Capacity Building: Development of multi-media educational materials, organization of teacher- training/ educator programmes, creation of a Space Volunteer Corps (SVC).

Appropriate framework for developing networks to coordinate national and regional activities:  
188 National Commissions, Cluster offices, National Offices, Regional Offices, Liaison Offices  
Associated School Projects network: more than 6,000 institutions at pre-school, primary, secondary, technical, vocational and teacher-training levels.

### **SPACE EDUCATION PROJECTS**

International Astronautical Federation

UNISPACE-III Follow-up:

Action Team 17 (Capacity Building)

Action Team 18 (Awareness-raising)

CEOS: Working Group on Education and Capacity Building

Type II Partnership Modules 1 and 2

### **UN MILLENIUM DEVELOPMENT GOALS**

E.g. Sustainable management of natural resources, poverty alleviation, eradication of illiteracy, etc. UN Decade on Education for Sustainable Development (2005-2015)

## **Building-up a Network of European Teachers W. J. Ockels ESA Space Education Programme, ESA/ESTEC**

Space is a subject that excites young people from the early age. The younger they are the more they expect to learn in playing and discovering. Reaching the mid-period of high school, when choices have to be made, they still like to have fun, but in addition, under the impulsion of their teacher, they like to relate what they learn with examples and illustrations taken from space missions and applications. Once at the university, even if the students have chosen a science or technology orientation, their motivation and enthusiasm grows exponentially, as they have the unique opportunity to be involved in space projects, i.e. in building their own satellite or microgravity experiment, in meeting experts at ESA or in specialised congresses.

The ESA Space Education Programme was set-up in 1998 with the overall long-term goals:

- To challenge and motivate a significant number of young people, through their active involvement in exciting projects, to enhance their literacy in space science and technology.
  
- To identify competent and creative individuals for the mutual benefit of themselves and the Agency, favoring a highly talented workforce for the 21<sup>st</sup> Century.

During the past four years of its initialisation, the ESA Education Office has developed several opportunities for high Education students to access ESA assets, opportunities and expertise. Through these hands-on projects, ESA is seeking the cascade effect on the student's peers as well as the creation of role models for the younger generation.

More recently, a high priority has been set on the secondary education, with a new initiative named ESTI (European Science Teacher Initiative). This partnership with the major European scientific organisations will develop as one of the major instruments to reach the European teachers from primary and secondary education in Europe. Successful projects conducted within this frame such as Physics on Stage are unique opportunities to interact and to understand the science teacher community.

The whole power point presentation of Dr. W. J. Ockels will be attached to the CD/ rom version of the Proceedings

**Space Education Latin American Plans for the future  
by  
Mrs T.M. SAUSEN**

**Ministry of Science and Technology, National Institute of Space Research  
tania@Itid.inpe.br**

**Argentina -  $\mu$ SAT 1 AND 2 - SATELLITE TECHNOLOGY AS PART OF HIGH SCHOOL SYLLABUS: AN INNOVATIVE EDUCATIONAL PROPOSAL**

Objective: To stimulate the interest of young people in space related activities by promoting their active involvement in schools and universities.

Technical Aspect: Conception, construction and qualification of very low cost station, able to operate the satellite directly from Educational Institutions.

Educational Aspect: Research and development of new courses and ways of instructions.

- Methodological applications to the curricula: Learning activities designed for different subjects in the projects (physics, geography, technology, etc),
- Interdisciplinary and extracurricular applications: for example, school newspaper, mini research project done by students of the "polimodal" system, project to be done within the community, etc.

<http://www.make.com.ar/victor>

Contact address: Prof. Ing. Luis Alberto Murgio- [lamurgio@make.com.ar](mailto:lamurgio@make.com.ar)

This project has been developed by Instituto Universitario Aeronautico –Cordoba, Argentina

**Brazil-SPACE SCHOOL FOR TEENAGERS**

It is a project developed and held by the INPE, AEB and CTA, whose objective is to introduce high schools students to space activities, in order to motivate them to choose professions related to space area, in private and public institutions.

The students have to attend several lectures and practical exercises on satellite building, satellite integration and test, remote sensing, meteorology, astronomy and astrophysics, satellite launchers, radiometric data collecting fieldwork, to launch small rocket under instructor supervision, the Brazilian Space Program, space activities in private sector, a lecture with the Brazilian astronaut.

The lectures and practical exercises are held at INPE and CTA laboratories and the instructors are INPE, CTA, AEB researchers and professionals from private companies, responsible for the main projects developed for these institutions

<http://www.inpe.br/unidades/cp/atividadescep/escoladoespaco>

Contact: Dr. Tania Maria Sausen - [tania@Itid.inpe.br](mailto:tania@Itid.inpe.br)

**Brazil-TRAINING NEW TALENTS IN SPACE SCIENCE AND TECHNOLOGIES: INPE AT SCHOOL**

Objective: to disseminate the space activities developed by INPE and PNAE to the student community in order to encourage new talents in space science and technology.

Main goals:

- To disseminate the spin off generated by the space activities developed by INPE and PNAE;
- To train school teachers in order to be able to develop class activities about space science and technology

- To encourage the students to choose a future career related to space science

8 private schools, 12 INPE researchers, 1 AEB researcher, 1 expert in education, 44 schools teachers and 588 students from grammar (6-14) to high-school (15-17) took part in this project

Exposition: in INPE Campus open to all communitysatellite models, CD ROM, Web pages, theater plays, dances.

Contact: Dr. Tania Maria Sausen - [tania@Itid.inpe.br](mailto:tania@Itid.inpe.br) INPE-S.J.Campos,SP

### **Brazil-SPACE BUS: A BRAZILIAN EDUCATIONAL PROJECT**

Objective: to disseminate the Brazilian space activities to ordinary people, mainly young students, through educational activities, in order to motivate the new generations to be involved with space area, and to show its benefits in the daily life.

The Space Bus it is a permanent road exposition about the Brazilian Space Program. It was set it up in a Mercedes Benz bus by a private company dedicated to cultural activities, the VK Aliança de Eventos Culturais, located in Curitiba city, Paraná state. This project has the cultural advisory from the INPE, AEB and CTA

Since October 2001 until now 31,509 people have visited the Space Bus.

Contact: [tania@Itid.inpe.br](mailto:tania@Itid.inpe.br)

[vkcat@bol.com.br](mailto:vkcat@bol.com.br)

<http://www.onibusespacial@onibusespacial.com.br>

Curitiba, PR, Brazil

### **SPACE EDUCATION-LATIN AMERICAN PLANS FOR THE FUTURE**

#### **Remote Sensing**

#### **Argentina--THE USE OF SAC-C IMAGES IN THE SCHOOLS**

Objective: to use SAC -C images in high schools as educational material in order to have update information to study the Argentinian natural resources such as rivers, cities, pollution, ecosystems changes. Besides, to give to the students a first approach about remote sensing.

Training course for school teachers in "Introduction to Remote Sensing":

- first requirement, to take part in the project;
- the course is giving each two months in the CONAE headquarter;
- it is a 40 hours course (20 hours lectures, 20 hours practical exercises);
- CONAE is planning to give this course in different regions in Argentina.

After de the course CONAE gives the images in CD ROM or hardcopy

75 schools; 80% public schools;12 training courses; around 120 teachers; 24.000 students

Follow up-CONAE use to following up the project through school visits and school reports.

<http://www.conae.gov.ar>

Contact:[educ@conae.gov.ar](mailto:educ@conae.gov.ar)

CONAE-Buenos Aires, Argentina

#### **Brazil--EDUCA SeRe Project III DEVELOPMENT OF MAP-IMAGE CBERS/INPE**

Development of map-image through CBERS/CCD images to be used as educational material in classroom, in geography, science, environment and history disciplines activities:

- Training course for teachers (3 days long);
- Educational material (text and course local map -image);
- Homepage
- Map-image and text files available for download in the homepage

It is designed to geography and science grammar and high school teachers.  
Up to now 95 teachers have attended the course.

Contact : Dra. Tania Maria Sausen –[taniamaria@itid.inpe.br](mailto:taniamaria@itid.inpe.br)  
<http://www.inpe.br/unidades/cep/atividadescep>  
INPE-São José dos Campos, SP, Brazil

### **Brazil-COURSE “REMOTE SENSING APPLIED TO ENVIRONMENTAL STUDY”**

Objective: to disseminate remote sensing technology to grammar and high school teachers, in order to use it as educational resource.

It is held every year during the winter school vacations in July. It is a 40 hours course.

At the end of the course the teachers are encourage to develop one semester project about remote sensing applied to environment. Up to now 20 projects were developed.

Since the beginning in 1988, 200 school teachers have attended the course, mainly teachers from public schools.

This course is held by INPE Remote Sensing Division and Training and Dissemination Activities Area

Contact-Dr. Elisabete Caria-[bete@itid.inpe.br](mailto:bete@itid.inpe.br)  
INPE-São José dos Campos, Sp, Brazil

### **SPACE EDUCATION-LATIN AMERICAN PLANS FOR THE FUTURE**

#### **Astronomy**

#### **Brazil-COURSE “INTRODUCTION TO ASTRONOMY AND ASTROPHYSICS”**

Objective: to introduce the fundamentals concepts of the Astronomy and Astrophysics areas, to the school teachers and undergraduation students. Besides, to present the scientific activities developed by INPE Astrophysics and Astronomy Divisions and the master and doctor programme in INPE.

Designed to grammar and high school teachers and under-graduated students, mainly those involved with science-physics, chemistry, mathematics and geography. It is a 40 hours course.

Since the beginning in 1988, 140 school teachers have attended the course, mainly teachers from public schools.

It is held every year during the winter school vacations in July, by INPE Astrophysics Division and Training and Dissemination Activities Area.

INPE-São José dos Campos, SP, Brazil <http://www.das.inpe.br/curso> Contact: Dr. Ana Maria Zodi – [anazodi@das.inpe.br](mailto:anazodi@das.inpe.br)

### **SPACE EDUCATION-LATIN AMERICAN PLANS FOR THE FUTURE**

#### **Meteorology**

## **Argentina- REMOTE SENSING TEACHING GUIDE-GOES IMAGES AND METEOROLOGICAL RADAR**

Objective: to disseminate the satellite applications for weather forecast and climate studies and SAC -C data applications. The program is developed by the Atmosphere Science Department of Buenos Aires University-UBA:

- high school students -visits to the GOES station to see the weather observation on real time;
- training courses for school teachers about "Introduction to Remote Sensing on Meteorology Applications";
- classroom activities using meteorological satellite data.

The "Guide to Remote Sensing Teaching in Meteorology-South American Applications" it is available on the following website

<http://www-atmo.at.fcen.uba.ar/satellite/curso/index.htm>

Contact:Dr. Ines Velasco

Velasco@at1.fcen.uba.ar Buenos Aires, Argentina

## **Brasil-ENVIRONMENT AND ATMOSPHERIC SCIENCE:THE USE OF MULTIMEDIA AND INTERNET IN THE PUBLIC HIGH SCHOOLS**

Development of CD ROM as educational material designed for geography, physics and chemistry in high school. The idea is to give knowledge about environment and atmospheric science in order to encourage the students to preserve the environment.

There are two CD ROMs:

1° CD-Hydrologic cycle, Interaction vegetation -atmosphere, Solar radiation, Climatic elements, Urban climate, Weather forecast, Climate;

2° CD-Precipitation measurement, Satellites and Data Collecting Platform

Homepage and Discussion Forum for students and teachers:

<http://www2.cptec.inpe.br~ensinop/forum/>

This project is developed by INPE/CPTEC

Contact: Eng. Fabio Loyolla

loyolla@cptec.inpe.br

INPE-Cachoeira Paulista, SP, Brazil

## **SPACE EDUCATION-LATIN AMERICAN PLANS FOR THE FUTURE Communication Satellite**

### **Mexico-EDUSAT SYSTEM**

Objective: it is a distance learning program to qualify school teachers and high school students that lives in rural and isolated areas

It has been developed in the last 30 years. There are more than 30,000 antennas around the country. It is developed educational material to support the project

Contact:Eng. Javier Roch

[jroch@mail.telecom.ipn.mx](mailto:jroch@mail.telecom.ipn.mx)

Puebla, Mexico

## **SPACE EDUCATION-LATIN AMERICAN PLANS FOR THE FUTURE Astronomy and Remote Sensing Uruguay**

Earth and Space Science:

- it was started as Cosmography and later has changed to Astronomy;
- it has been given in the last 114 years
- high school discipline

Universe Time:

- radio program about space science designed to teachers, students and community
- earth observation, satellite application,
- the universe, planets, the moon,
- the ISS
- it has been presented since 1993

Telecosmos:

- a TV program designed for grammar and high school students,
- remote sensing and applications,
- the universe and the outer space

Contact: Prof. Fernando Gimenez Minonne  
 telecosmosuruguay@hotmail.com  
 Montevideo-Uruguay

**Chile-METHODOLOGY OF REMOTE SENSING TEACHING IN HIGH SCHOOL AND UNDERGRADUATION LEVELS-** it is a proposal to qualify undergraduate students in geography, geology, cartography, environmentalist and forest engineer, in remote sensing and GIS in order to work with high schools students and teachers in their future professional life. This project is develop by the University de Santiago, Chile

Contact: Eng. Roberto Richardson rrichard@lauca.usach.cl

**Chile-ASTRONOMY PROJECT-** in partnership with Chilean and Russian high schools students, it is coordinated by the Chile Minister of Foreign Affairs. It was held a camping meeting, 15 days long, with Chilean and Russian high students, in Chile

Contact: Mr. Antonio Correa  
 Dipesp4@minrel.cl

### **SPACE EDUCATION-LATIN AMERICAN PLANS FOR THE FUTURE Conclusions**

- The Space Education Activities in Latin America are concentrated mainly in Argentina, Brazil, Chile and Uruguay and in Astronautic, Astronomy, Remote Sensing and Meteorology areas;
- There was a very interesting initiative in Bolivia, in order to introduce Remote Sensing activities in grammar and high school regular curricula. The SELPER and Bolivian Minister of Education signed an agreement to develop curriculum, educational material and teachers training program, in Spanish and Aymara (local language);
- Argentina and Brazil are very concerning about space education, mainly after the SAC -C, CBERS and SCD satellites launching;
- The "I Workshop on Education in Remote Sensing in Mercosul" was a milestone in remote sensing education in Mercosul region. Since that all Mercosul countries members (Argentina, Brasil, Paraguay and Uruguay) an the associated countries (Bolivia and Chile) have increased their activities about RS education, and consequently about space education in general;
- Since 1997 the number of educational material in space area, for all educational levels, has increased in the region. This is very important because this material is developed in Spanish

and Portuguese. Until 1997 all educational material in space area was in English and this was one of the most important barrier for the dissemination of space activities among the teachers and students community;

- Besides this, today the educational material and educational activities in space area in Latin America are using examples from the region, close to the students and teachers daily life and the place where they live;

- Basically all educational activities in space area in Latin America are personal initiatives from researchers, professors or professionals from private sector. In spite of the activities have institutional support they have started because one person or a small group of people believe they are important for the country. Usually these people move all the initiatives and keep the ideas alive.

The last and THE MOST IMPORTANT

- The problem of space education in Latin America it is not the LACK OF MONEY;
- The problem is the LACK OF INVOLVEMENT AND COMMITMENT OF THE INSTITUTIONS AND EDUCATIONAL AUTHORITIES in space education;
- The countries in Latin America are considered developing countries, and we use to say that we cannot do anything in space education because we do not have money.

This is not true. We have money, maybe it is not a fabulous amount, but it could be enough for education if we know how to find it and to use it.

- The main problem in developing countries is the LACK OF A REAL COMMITMENT WITH EDUCATION IN GENERAL. That's why developing countries are developing countries.

- We have to motivate and to get the commitment of the education authorities in Latin America in order to spread out this information in all regions.

- Believe me, to get the educational authorities commitment it is the hardest task in the space educational programs

- The problems in space education in Latin America it is not only a question of money, it is basically a question of to CHANGE HEARTS AND MINDS

### **Comments from Participants about all the presentations**

After all the presentations, participants brainstormed on the following points:

1. Relation between the education projects and the recommendations
  2. Targets of the possible common projects
  3. What kind of projects could be chosen during the workshop
- 
1. Participants suggested broadening the recommendations to the use of media to reach young people. The opening of initiatives to science fiction writers might be of help.
  2. It is important to define very early the target of the education project: if we address to UN, Ministries or if it is a bottom-up approach then there's a big difference and we should know this in advance.
  3. As suggested by the organizing committee the workshop should focus on the identification of the most significant projects we know and on their results. Then we should concentrate on the implementation phase. Transferability to other Countries should be one of the assets.

UNESCO representative stressed that it is not so important to classify project by region or area as to come up with something tangible as a useful reference. A discussion about the distribution of educational material came up. The problem is to provide material and to distribute it all over the world. Copyright should be free and available to everyone in order to produce materials in their Countries.

**Organization of the work of the splinter sessions and plans for the preparation  
of the elements of a high-level Agreement  
by  
P.L. Contreras  
Director, CNES Space Education Programme**

The idea is to give floor to the participants in order to:  
present real project and identify Standards and lessons that can be learned from their  
success or their failure

- understand different ways to promote education
- Validate these suggested categorization of projects (9), and eventually to add new categories
- Recommend projects and experiences that could be extended to other countries and could be suggested as pilot projects
- Discuss the suggested elements of a high level agreement that could be presented at UNESCO

In order to achieve this, the participants will be split into 3 splinter groups that will work in two sessions:

**Splinter Session 1 (3 groups working on all types of Projects)**

Each group:

- To review and to enhance the suggested categorisation of Education projects
- In the frame of this typology, to identify and to review successful (and unsuccessful) projects based on the experience of the participants. National and International cooperative projects including experience with Developing Countries.
- For each project, to find the "philosophy", the methodology and the lessons learnt (positive and negative aspects) behind the successful and unsuccessful experience.
- To prepare a summary table of the projects sorted by category

**Splinter Session 2 (3 groups organized around the categorization of projects)**

Each group, for given categories of projects:

- To review the evaluation and implementation criteria for proposed Pilot Projects
- To define for each proposed Pilot Project (description, scope of cooperation, target groups, implementation timing and methodology, necessary means and resources)
- To assess, for each proposed Pilot Project, the level of difficulty for implementation and potential of transferability to other countries.
- To summarize the analysis in a table according to Format 2 of Annex 2

**Elements of High Level Agreement**

Four categories of recommendations are suggested for discussion:

- Space education material (information, data, hardware, training) is recognized for bringing interesting examples and information to enhance global education



- Countries having space education material are invited to allow use by other countries and provide basic set for duplication
- International bodies are invited to help to promote the distribution of such information and material to interested countries and help duplication of this material
- Space infrastructure can allow a better coverage of education to distant location.

## **. Splinter Session 1 (14 March 9h00)**

### **Identified categories of projects and examples of projects per category**

The group worked on the categorization of the projects by type of activity. For each category, some examples have been presented in order to animate the debate. This list is by no means exhaustive, but illustrative. Also, very often, these projects are relevant to other categories. We selected the one that was felt as the main. More details can be found in Annex 2.

- 1) Projects involving youngsters in Hands-on activities (e.g. building space hardware such as satellites, Mg experiments, etc.)

Venus transit Project  
 Orbital Graph w/launcher  
 MG in Shuttle  
 Parabolic Flight Campaign for Students  
 Small Satellite design and development by Students  
 Fisica en Accion  
 Brazil Students Micro Satellite  
 Uruguay Small Sat Education Programme  
 Challenger Centres  
 Rocket Clubs  
 UN Stars  
 Yuri's Night  
 Space Camps  
 SETI at Home

- 2) Projects involving youngsters in getting data on Earth for environmental, meteorological analysis, understanding, etc.

Multi disciplinary approach to EO  
 Brazil SAC -C Image uses in High Schools  
 Brazil EDUCA Se Re Teachers Training  
 Brazil Remote Sensing Course to Teachers  
 GLOBE  
 EDUSPACE

- 3) Awareness raising initiatives geared towards youngsters to help them understand space in general, space applications in daily life (e.g. natural resource management, disaster reduction, medical issues etc.) and the cultural aspects of space.

Planetary Geology  
 Catch a star  
 Permanent Frost Experiment  
 Visit of Astronauts  
 Space and society  
 Multidisciplinary Approach on Environment

Animal migration study  
Cosmic Collage  
Space Festival, Science Festival  
Physics on Stage  
Brazil Space Bus  
Mexico Edu Sat System  
Chile Space Education Programme  
Chile Space Camp with Russia  
EURISY PhD Summer Schools  
Space Alphabetization  
ESA Milkman space city

- 4) Development of Educational materials for students and teachers (Primary, Secondary Education)

Several Space Agencies Programmes related Development of Educational Materials  
School of Teachers

- 5) Involving teachers from various nations, including Developing Countries and train them on the use of space tools and applications and how to integrate space in their courses.

Course on Astronomy for teachers  
Course on Meteorology  
Several other examples of teacher's training programmes  
ESA Science Teacher Initiative

- 6) Inviting youngsters to participate in Space Workshops and Conference in a systematic way through a well-established world-wide mechanism (attendance, debate)

ESA Student Participation Programme at IAF

- 7) Connecting classes from primary, secondary and universities from different countries through Web activities and student exchange Programmes

Localization of collection of data  
Website on Mediterranean Sea for Teachers  
Astronomy on line  
Students mentoring  
Brazil Teenagers Education  
INPE at School lectures

- 8) Connecting youngsters and teachers through associations, clubs and extra-curricula activities

Under African Skies  
Language Teachers Network

- 9) Preparation of inputs based on space as a topic or as an illustration, into curricula of primary, secondary and higher education

See several space agencies projects

## .2 Suggested Strategic Objectives for the introduction of Space into education

**Strategic objective n° 1** – To introduce **Space in Education** reaching as many students as possible with a coherent program.

- Objective n° 1.1 – To co-ordinate educational programmes.
- Objective n° 1.2 – To create a network of educational institutions in order to reach as many schools as possible.
- Objective n° 1.3 – To raise awareness in students about how space is part of everyday life (key subjects: environmental monitoring , transfer technology).
- Objective n° 1.4 – To open interdisciplinary links between school subjects.

**Strategic objective n° 2** – To motivate young people to become future professionals in Space and Space related activities enhancing **Education in Space**.

- Objective n° 2.1 – To involve secondary school students in scientific and space-related projects.
- Objective n° 2.2 – To assist students through career orienting programmes in order to create a link between science and space-studies and job opportunities.
- Objective n° 2.3 – To make students participation to Space initiatives more systematic.
- Objective n° 2.4 – To promote a multi cultural approach to science and space related subject organizing school exchanges and encouraging international students associations.
- Objective n° 2.5 – To integrate the efforts of universities, governmental and intergovernmental agencies, industries and international organizations in order to reach the above-mentioned objectives.

**Strategic objective n° 3** – To provide tools to improve technology and space related education. **Space** can be unique **tool for Education**.

- Objective n° 3.1 – To allow an easy access to the satellite related infrastructures
- Objective n° 3.2 – To update regularly pedagogical material for primary and secondary schools with space subjects.
- Objective n° 3.3 – To improve the training of secondary school teachers.
- Objective n° 3.4 – To allow students of primary and secondary schools to meet space experts in order to increase their enthusiasm and answer to their questions.

### Splinter Session: Members of the Splinter Groups

<b>Group</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Moderator</b>	Philippe Willekens:	Francois Becker	Pierre- Louis Contreras –
<b>Rapporteur</b>	Dorothea Czernik –	Shane Kemper	Carsten Holze
<b>Members</b>	Randy Stone Yolanda Berenguer Jim Volp Valerie Hood Peter & Barbara Wood Vincenzo De Chiara Takemi Chiku Sylvia Gehlert Guy Pignolet Chris Greenfield Tania Maria Sausen Chris Welch	Philippe Noel John Webb Michel Vauzelle Jean-Daniel Dessimoz Stephan Brock Fernand Wagner Rachid Amekrane	Micaela Bracciaferri Yasunori Matogawa George Haskell Louis Laidet Anne Serfass Rosa Maria Ros Ernesto Vallerani

### **Minutes of the Splinter sessions**

After further instruction the participants were requested to attend the splinter sessions. The three groups discussed and identified key space education issues and steps that could be performed to reach the strategic objectives and identify possible solutions. The approach proposed was to identify possible pilot projects that could not only evolve to changing needs, goals, and resources, but also that would have an impact across different cultures .

#### **Group 1. Moderator: Philippe Willekens**

The splinter group discussion started with focusing on the analysis of the past recommendations and of the strategic objectives as a point of reference for the projects. Each participant presented projects highlighting positive and negative aspects. The moderator of the group suggested to move away from past recommendations and to make a step towards implementation plans. Among the possible avenues, the participants mentioned

An increased use of the media as a tool to bridge space and education  
The necessity to open education to all (with reference to rural or isolated area, developing Countries etc.) The need to motivate young students by stressing the many opportunities that space can offer. (its multidisciplinary scope, its impact on the quality of life, medicine, employment, etc.)

Participants presented their own experience reflected in the table of projects shown in Appendix 2.

#### **Group 2 Moderator: François Becker**

The participants of this splinter group proposed to bring together schools and industries at a secondary level, as usually this initiative is carried on at post secondary level. A strong link between professional organizations, museums (e.g. science museums) and education teams should be done.

In order to avoid the creation of tensions among the pedagogical team and to motivate all the teachers in a class, it has been found that it is important to include most of the disciplines in a project and therefore to set up team working on multidisciplinary projects.

Based on their own experiences, the members of the group made a list of challenges that space community still has to face in order to improve the introduction of Space into Education:

- Motivation: of individuals and of supporting organizations
- Continuity: in order to achieve continuity relays of individual initiatives from organizations are key elements of success. It has been found that the existence of an education department in a Space Agency is extremely important to support individual initiatives, to insure the continuity of the most successful ones and for the development of such experiences.
- Interest of contest: in order to increase the motivation of pupils and of teachers, organization of contests appears to be very stimulating
- Social recognitions (awards): in order to encourage the teachers to develop initiatives in the introduction of Space into education, the creation of a special award would contribute to develop the necessary social recognition of their efforts
- 
- Access to info, data, copyright: Individuals who are interested to introduce Space into education have to be guided. Access to what has been done and how, access to data and material with the appropriate copyrights are key elements of success. The support by teachers' professional organizations and journals are also key elements of success.

Participants presented their own experience reflected in the table of projects shown in Appendix 2

#### **Group 3 Moderator: Pierre-Louis Contreras**

A round table with a deep overview on all the projects of the members took place. Participants presented their own experience reflected in the table of projects shown in Appendix 2

### **Plenary Session 3 (14 March 14h00)**

**Based on the report from each Splinter Group, integration of all projects identified by the splinter groups within the commonly defined classification framework. The projects could be newly proposed or enlargement/extension of existing ones.**

#### **Review of results from the splinter sessions**

The moderators of the splinter groups presented the outcome of the morning discussion. The necessity of defining the meaning of "pilot project" came out. The key is to define an already existing successful project that can be implemented in other countries.

According to the UNESCO representative, the approach should be top down in addressing Education Ministries. It is difficult for them to work on the bottom up approach. The key issue is to present a success story and give it the label of an international project.

### **Splinter Session 2 (14 March 15h300)**

#### **Splinter Group 1. Moderator: Philippe Willekens**

The splinter group no.1 focused on how to reach young people and stimulate their interest about space. A top-down approach would be effective: people don't know about space and therefore space cannot be successful. Before arriving to the student level it is necessary to raise awareness at higher level.

Everybody agrees on the connection of space with everyday life: environment and environmental resources could be attractive for young people. The difficulty is to train the teachers: each project should include a "train the trainer" section involving the whole school structure and not only the students. One of the participants suggested to embrace Natural Resources and Astronautics as back bones. It is important to give reasons and to show cost-benefit for everybody, so that students can become better citizens.

The members of the splinter group brainstormed on the methodology that can be applied to implement pilot projects such as: sister cities and Information Centre. The starting point should be a series of best practices, an analysis of the feasibility of the project, the international label that allows transferability to other Countries. The problem of the translation in other languages came out, one of the solutions suggested was to ask teachers to translate and adapt the materials themselves.

From the lessons learnt by all the participants some common elements emerged: the lack of commitment from High level academic and political decision makers; the need to use multipliers in order to avoid the elite effect for a limited group of teachers; the need to have different kinds of distribution systems depending on the Country's situation.

#### **Splinter Group no.2. Moderator: François Becker**

From the analysis of all the projects identified, based on the criteria that are presented in appendix 2, and from the experiences of its members, the splinter group no.2 identified those projects and experiences that could be extended to other players and countries, particularly developing countries. Among them, they recommended to propose as pilot projects: UNESCO platform for Space Literacy Space Education projects that could be presented at Space festivals organized at local, regional, national and international levels., Space in the Roads in developing countries, development of curricula introducing space into education (see description in annex 3),.

Splinter Group no.3. Moderator: Pierre-Louis Contreras

The group gave an insight on the following proposed pilot projects: NASDA (ISAS) Young Astronaut Club), teachers Space Education Program- cosmic collage; Science festival experience with teachers and students (2001- Science Festival); participants from CNES and EAAE illustrated their positive experiences in space outreach activities.

**Concluding Session (15 March 10h30)**

**Presentation and discussion of the summary report prepared by the IAF/IAA Study Group on the basis of the reports of the splinter groups.**

**Adoption of the elements of the high-level Agreement and of the action plan to be presented at Bremen and during the UNESCO conference**

**Organization of the follow -up work:**

- **Report to the Plenary session in Bremen**
- **Report to the UNESCO General Conference through an information session**
- **Proceedings and Publications of the IAA/IAF Study Group**

**Concluding remarks by R. Missoten UNESCO**

**Conclusions by K. Doetsch**

---

**Presentation and discussion of the summary report prepared by the IAF/IAA Study Group on the basis of the reports of the splinter groups.**

**Review of Projects**

- Commitment with local community leaders is a key, start with simple concept.

Next splinter (note: I do not understand this next splinter)

- Turn the negative points into positive through a pilot project exercise

Look into pilot projects criteria for selection, success assessment, phasing from idea to pilot phase up to fully labeled project

**Pilot Proposal Proposals**

- Space Festival concluding a series of space education projects. Youngsters have to design interdisciplinary projects, including hands on activities/projects. Forum for students and teachers open to public.
- Build a platform for space literacy that enables the collecting and distribution of pedagogical materials and existing resources made available to all. Including a set of best practices and methods of successful projects
- Space on the road in developing countries. Traveling teachers or educators with teaching materials
- Developing space into the curriculum using both top down and bottom up approach (long term project)

**Adoption of the elements of the high-level Agreement and of the action plan to be presented at Bremen and during the UNESCO conference**

Summary: **Elements of High Level Agreement**

- Space is recognized for bringing in Education, interesting examples to enhance global education and to allow a better coverage of education to remote location, in particular to Developing countries.
- Space organizations are invited to commit through a charter to the following principle of sharing space education materials and to provide basic set for duplication

- International bodies such as UNESCO are invited to help promote the distribution of such information and pedagogical materials to interested countries and help duplication of it.

As a result of the various meetings held on the subject of “space and education”, the question has been raised to propose a way to put the various recommendations in a real work within the countries. This “charter” could be endorsed by UNESCO and/or taken as a proposal of UNISPACE III action teams COPUOS work or IAA/IAF education team. Pilot projects have been identified to give concrete examples of implementation and show possible cooperation schemes.

Three ideas are developed:

First of all, to assess that Space is a good and useful tool to provide examples in most of the subjects taught to the young people. Because of its prestige it can attract the youngsters and enhance the interest to the scientific studies.

Secondly, education material already exists in some countries which have a space activity and we have to encourage them to provide it but without the charge of distribution to the other countries.

Thirdly, only international bodies can ensure this distribution charge because they know the potential needs and have this international mandate.

From these three key ideas a possible wording is as follow to be adopted as principles by the countries.

- Space is recognized for bringing in Education, interesting examples to enhance global education and to allow a better coverage of education to remote location, in particular to Developing countries.
- Space organizations are invited to commit to the principle of sharing space education materials and to provide basic set for duplication
- International bodies such as UNESCO are invited to help promote the distribution of such information and pedagogical materials to interested countries and help duplication of it.

After the endorsement of these basic ideas which gives a commitment from High Level academic and political decision-makers, each country with its own national education standards has to go ahead and can develop its own coordinated actions.

Four pilot projects have been identified as follow because they are recognized as the most efficient way to develop such activities:

- Space Festival concluding a series of space education projects. Youngsters have to design interdisciplinary projects, including hands on activities/projects. Forum for students and teachers open to public
- Space on the road in developing countries. Traveling teachers or educators with teaching materials
- Build a platform for space literacy that enables the collecting and distribution of pedagogical materials and existing resources made available to all. Including a set of best practices and methods of successful projects
- Developing space into the curriculum using both top down and bottom up approach (long term project)

Finally, to contribute to the success of such activities in new countries, it is suggested that countries which already practice, could welcome for some months a representative who will have later on in charge to install the activity in his own country.

**Organization of the follow-up work:**

- **Report to the Plenary session in Bremen**
  - **Report to the UNESCO General Conference through an information session**
  - **Proceedings and Publications of the IAA/IAF Study Group**
- 
- Results of this workshop should be brought into the current work of the UNISPACE III action teams
  - From the Elements of the High Level Agreement, formulate recommendations adapted to the mandate of UNESCO, UN-COPUOS and IAA/IAF and related to the Pilot Projects proposed and their implementation

**Minutes of the Concluding Session**

(note: I do not think that this should be on the minutes. This has been added at the beginning of the minutes). It was also asked if the workshop proceedings will be available in other languages besides English. It was requested that the results of the workshop would be presented to some of the Regional UN Centers.

During the closing comments, UNESCO (SEP) representative presented the idea that SGAC and ISU could assist in attracting volunteer to work on UNESCO's Space and Education Projects.

During the closing session, Dr. Doetch and Prof. F. Becker asked SGAC representatives to provide assistance to UNESCO in supplying names and contacts for a broad distribution of the results of the IAA/IAF/UNESCO study results and proceedings of the workshop to the UN Regional Centers and other NGO's throughout the world.

It was recommended that UNESCO would contact science teachers to assist and work on several of these proposed pilot projects.

Special appreciation from all the delegates was given to the assistants for their excellent support to the workshop.

Dr Doetch concluded:

"The diversity of the backgrounds gave a rich discussion and by making sure that we did not re-invent the wheel, we can built upon the work and the experience from the past, and the present. I am pleased that the discussion addressed interdisciplinary aspects of Education and gave a large place for the co-operation with the developing nations"



## Annex 1 - REVIEW PAST EVENTS ON SPACE AND EDUCATION (2)

**Event:** Space Agency Forum

**Place and Date:** Rio de Janeiro, 5 October 2000

**Participant's target:**

The Space Agency Forum (SAF), endorses the importance of space education, and affirms the value of international cooperation between space agencies of the world in furthering efforts in this area.

**Recommendations:**

The formation of a Task Force of the SAF to explore new ways for advancing space education efforts in and between countries of the world.

**Main Conclusions:**

- The initiative will span space education at all levels, including elementary, high school and university levels. Professional development and training will form part of the mandate of the group
- Particular emphasis will be directed towards space education in the developing world.
- The effort will examine how to better integrate the efforts and interests of the many players involved in space education, including academia, government agencies, the private sector and other non-governmental entities.

**Participants' impressions/comments:**

Regret: The presence of industry experts was not consistent

Satisfaction: Excellent turnout of secondary students with their teachers, ISUsers and young professionals.

## REVIEW PAST EVENTS ON SPACE AND EDUCATION (3)

**Event:** ISU/IAF Conference on Bridging Space into Education

**Place and Date:** Strasbourg, France, April 2000

**Participant's target:** Space professionals from universities, agencies, industry, teachers and students from secondary

**Recommendations:**

- 1) Need to have available a core package (kids pack) in which students and teachers can find basic information on space. This package should be present in taking into account the multi-disciplinary and multi-cultural aspects of space programmes
- 2) Need to maintain a part of dream and to cultivate the original passion the youngsters naturally have for space. It is felt important that space helps to better understand fundamental questions about origin of life, the creation of Earth, the universe, etc.
- 3) Need to open interdisciplinary links between education matters. Space can be an excellent link between scientific and non-technical matters such as literature, history, philosophy, etc. Youngsters are more interested in special events, visits, hands-on experience, which remain optional than additional courses on existing programmes
- 4) Need to reinforce networking relations among associations and clubs interested in space activities and who regularly organize events, training summer camps, etc.

**Main Conclusions:**

- The key ingredient and factor of motivation of youngsters for space is their natural enthusiasm for it. The educative structures put in place to bring space into education should keep feeding this passion and utilize the energy that youngsters can invest in a project related to space.
- The existing curriculum is already very heavy, not to mention the countries where basic education can't even fit the programme. Projects related to space in form of hands-on should be proposed and not imposed.
- There are many organizations and clubs who are prepared to play a key role as a bridge between space and education. These structures should be reinforced and linked as well as be accessible by the largest public as possible.

**Participants' impressions/comments:**

Regrets: There were not enough students

Satisfactions: The student round table that took place

## REVIEW PAST EVENTS ON SPACE AND EDUCATION (4)

**Event:**

Joint IAF/ISSAT/ISU workshop "Space Education for the New Millennium".

**Place and Date:**

Toulouse, 3-4 October 2001

**Participant's target:**

The workshop was embedded in the International Astronautical Congress sessions on Education with the addition of two plenary sessions (an opening and a closing session) with high-ranking space professionals from Space Agencies and universities.

The three main themes of the Forum will be:

- Hands-on Education using Space Projects and Application Programs involving Industry and University
- Partnerships between Industry, Universities and Agencies
- Use of New Communication Technology to support Educational and Training Programs.

The Opening Session will be chaired by Prof. Hubert Curien, Chairman of the French "Académie des Sciences".

**Recommendations:**

Because of the high importance and relevance of the subject to the future development of the Space activities, I warmly invite Industry leaders to give a keen interest to this Forum and to encourage their staff to propose papers for the technical sessions.

**Armand Carlier, Chairman and CEO, Astrium**

## REVIEW PAST EVENTS ON SPACE AND EDUCATION (5)

### ***Events:***

World Workshops on Space and Education

### ***Place and Date:***

Torino, IAC, October 1997

Melbourne IAC, October 1998

Amsterdam, IAC October 1999

Rio, IAC October 2000

### ***Participant's target:***

The World Workshops on Space Education promotes outreach, education and training in astronautic and space engineering. Its annual venue on the occasion of the IAF Congress brought together representatives from space agencies, universities, industry and various other actors who are actively taking part in space and education.

### **Philosophy of the World Workshop on Space and Education**

The World Workshops on Space Education brings together space leaders, educators and students for the purpose of identifying space programme needs, and formulating strategies for motivating, guiding, and qualifying students of all ages to engage in space related careers to meet those needs.

The World Workshop on Space Education (WWSE) meets annually the day before the opening of the International Astronautical Federation Congress.

Over the past four years, WWSE has evolved from a concept to impress upon global space leaders the importance of a well-educated, motivated, and qualified space-aware younger generation, to a sounding board action group of space leaders who return to their space programs with implementable initiatives to ensure the solid education of this next generation, which will carry the torch of space exploration and space utilization into the future. WWSE has received wholehearted support and participation from heads of space agencies, educators, and space industry employers.

In 1997, the WWSE Statement of Purpose was expressed "to bring together representatives of the Space Agency Forum (SAF), the International Space University (ISU), and the International Astronautical Federation (IAF) Education Committee, and others including representatives of space industry, academia, and government for the purpose of ongoing discussions of the value of space education and its current and future global implications."

### **The following Goals of WWSE were established:**

- To become an open forum for ideas on improving the effectiveness of space related education from space agencies, space industry, space users, space related organizations, academia, and the general public.
- To exchange perceptions of current education as needed for development of space.
- To spark creative dreaming of previously unthought of educational concepts for promoting the benefits of space to humanity.
- To develop action items to assist member organizations in promoting these goals.
- To cooperate with the United Nations by participating in its Workshop at the IAF Congress each year.

### **Torino 1997**

It all began with the results of a broad-based survey of training managers in private sector space companies around the world. The First WWSE, chaired by Karl Reuter of SAF, was held at the IAF Congress '97 in Torino, Italy. It proceeded on the basis of the ISU report on studies commissioned by SAF on the "current and future needs of space education".

The Study, commissioned by SAF at the Beijing IAF Congress in 1996, surveyed managers of training at companies in 1996. Focus group meetings with ISU and top managers of industry and space agencies were conducted in 1996 and 1997. A Space Education Workshop, attended by representatives of ISU, ISU Affiliate Universities, space agencies, and the IAF Education Committee, was held at ISU in May 1997.

The findings of the Study Report adopted by WWSE were the following:

- (1) Training managers desire outside professional training as a source for new ideas.
- (2) The role of space agencies ought to be to encompass science, technology, and space flight.
- (3) The most valuable educational and training approach for project team development is interdisciplinary.
- (4) The most important public awareness target is the 5-18 years age group.
- (5) Internet training for teachers as well as students is necessary.

### **Melbourne 1998**

The Second WWSE held on the Sunday prior to the opening of the IAF Congress '98 in Melbourne, Australia competed with a National Soccer Playoff Game. Nevertheless, the WWSE was well attended as Peter Wood, Chairman of Board of ISU, delivered a keynote address on "Career Professionalism" that was applauded by students and employers alike. George Haskell, Vice President of ISU, and Peter Kurzhals of Boeing Aerospace served with Peter Wood on the panel which sparked lively interaction with the participants.

### **Amsterdam 1999**

The Third WWSE, at the 50th IAF Congress '99 in Amsterdam. For the first time, under the initiative of the ESA Education Office, the Congress offered a special focus on youngsters by having the participation of nearly 500 students from several countries to attend. Dr. T. Godai, Vice-President, NASDA Japan presented a keynote address of Japan's excellent student programs and future plans to promote space education. Jeff Hoffman, NASA Astronaut, USA was the featured speaker outlining NASA's education programme globally available by internet. The 1999 edition of the Workshop focused then on pre-college education, and addressed, in particular, the outreach process and the need for education of youngsters ranging from 12 to 18 years old.

The panel of space leaders, including S. Van Dijck, a student from The Netherlands, who provided insightful comments, discussed the future of space education with respect to the following topics:

- Plans to introduce space topics in pre-college education programmes,
- Teaching teachers and developing supporting materials ,
- Space professionals as "first line" educators of youngsters,
- The needs of the 12-18 year old generation.

### **Rio 2000**

In 2000, the Fourth WWSE met Sunday 1 October 2000 from 1400-1700 in the IAF Congress in Rio de Janeiro. The theme of the Workshop was "Undergraduate Space Education for the 21st Century". This WWSE explored, from perspectives of government, industry, academia and professional associations, ways to enhance worldwide space education for undergraduate students in the 21st century.

Keynote speaker, Roland Doré, past president of ISU, expressed the importance of specialist training for undergraduate students. Such a solid education could be later transferred into specialized or interdisciplinary space education. François Becker, ISU Dean, presented his "3-I" Pedagogy theory of cross-feeding disciplines. Peter Wood, ISU Board of Trustees Chairman, led a lively panel discussion with panellists from France, Israel, Canada, Chile, Germany, USA, and UK, involving the audience with a question and answer and comment format. Conclusions concurred that age scale space education as presented by Philippe Willekens has merit that should be explored. Space Generation Forum cooperation with United Nations should be followed closely to gain insight of UN global education discussions. Injecting space themes into a curriculum may be at the discretion of individual teachers of non-space related courses advised Margaret Doetsch, and panellists concurred that developing methodology for such an initiative would be a valuable contribution to space education.

### **Toulouse 2001**

The Fifth WWSE took place at Toulouse, France during the 52nd IAF Congress 2001. The topic of the workshop was "Space Education for the New Millennium", and kicked off a week-long space education thrust within the Congress. IAF, ISU, and SAF joined forces with ISSAT, the Institute of Space Science and Applications of Toulouse, combining ISSAT's 2nd Annual Forum with WWSE's 5th workshop. The 2 day forum consisted of an opening workshop and a closing plenary session encompassing the Space and Education Symposium paper sessions, the student conferences, and space and education public outreach events. The magnitude of this collaboration caught the attention of Congress participants as never before, and the subject of space education achieved high visibility and unmatched recognition.

Led by Professor Hubert Curien, Président Académie des Sciences, ancien Ministre, a panel and invited speakers represented space industry, academia, and space agencies.

### **Houston 2002**

The Sixth WWSE organized at the World Space Congress 2002 in Houston Texas USA, was a collaboration with another education-minded organization, the Workforce Development Summit II, a workshop sponsored by Boeing, AIAA, IAF, COSPAR, and Aviation Week publishers. In joint cooperation with WWSE, panels and roundtable discussions involved aerospace industry leaders, recognized educators, government officials, representatives from the media, students, and other participants outside of the aerospace industry.

The one-day program, held just prior to the opening of the World Space Congress, will introduce the IAF Space and Education Symposia, and other space education-focused sessions. The WWSE/Workforce Development Summit participants will explore the cultural perspectives of space education, the role of industry and professional societies to ensure an appropriately educated workforce, the infrastructure of life-long learning for knowledge of and from space, and the influence and impact of the Space Generation Forum and the Space Generation Advisory Council to the United Nations. An integrated view of space education, defining a future focus of workforce development within the space field will conclude the session. The WWSE provides incubation of ideas that, once expressed and communicated, can be carried forward by others to implementation. The ISU core textbook is one example. Another inspiring example is the proposal by the Space Generation Forum at UNISPACE III in July 1999 that space topics should become an integral element of pre-college education curricula worldwide.

## REVIEW PAST EVENTS ON SPACE AND EDUCATION (6)

**Event:** IAF Space and Education Seminar

**Place and Date:** Frascati (Rome), Italy 20-23 March 1999

**Participant's target:**

Participants were representing the whole chain of key players in the education process, from secondary school youngsters and teachers, university students and teachers, space professionals and space educators, professional societies, space industry and government organisations.

**Main Conclusions:**

- The group re-emphasised one of the conclusions made on the occasion of the last edition of the IAF Space and Education Seminar held in Belgium in 1998: the need to **"teach the teachers"** and to prepare the **information** in the correct format and in the different national languages
- Space organisations, private and public have to assist in collecting the information and support the teachers and students in their projects. There is a need for more "guides" or user manual adapted to youngsters of the different age groups.
- **Networking** will be a key to the success of space education in a world of information technology.

## REVIEW PAST EVENTS ON SPACE AND EDUCATION (7)

**Event:** World Conference on Science for the Twenty-First Century: a New Commitment

**Place and Date:** from 26 June to 1 July 1999 in Budapest, Hungary

**Participant's target:** The Conference addressed and involved national governments and institutions, educational and research establishments, members of the scientific community, the industrial sector, intergovernmental organizations (IGOs) and international scientific non-governmental organizations (NGOs), as well as the media and the general public.

**Recommendations:**

Countries should adopt best practices for advancing innovation, in a manner best suited to their needs and resources.

Governments should accord the highest priority to improving science Education at all levels, with particular attention to the elimination of the effects of gender bias and bias against disadvantaged groups, raising public awareness of science and fostering its popularisation. Steps need to be taken to promote the professional development of teachers and educators in the face of change and special efforts should be made to address the lack of appropriately trained science teachers and educators, in particular in developing countries.

New curricula, teaching methodologies and resources taking into account gender and cultural diversity should be developed by national education systems in response to the changing educational needs of societies.



**Annex 2 a - FORM 1 – Table of Projects per type -**

<u>Name of the Project</u>	<u>Experience (Positive, Negative) - Initiator, countries involved</u>

**Annex 2b - FORM 2 - Table of Pilot Projects and evaluation**

<b>Description</b>	
<b>Target group – type and quantity</b>	
<b>Means and resources</b>	
<b>Timing for implementation</b>	
<b>Rate of difficulty of implementation</b>	
<b>Transferability to other Countries</b>	
<b>Adherence to strategic objectives</b>	
<b>Actors</b>	

Annex 3 - Table of the Projects Presented by Participants

	Category & Name	Initiator	Country	Target	Experience
1	Venus transit project	EAAA	Europe	Students	Pos
1	Orbital Graph w/launcher		France	Students	Pos
1	MG in Shuttle	ISU	F	Students	Pos
1	3,4 Fisica en Accion	EAAE, RSEF, RSME	Spain	Students/Teachers	Pos
	Brazil Students Micro	INPE, Instituto Universitario			
1	Satellite	Aeronautico	Argentina	Students/teachers	Pos
	Uruguay Samll Sat				
1	Education Programme	INPE	Uruguay	Teachers	Pos
1	3 Challenger Centres	NASA	USA	Public	Pos
1	3 Rocket Clubs		International	Youngsters	Pos
1	3 UN Stars			Public	Pos
1	3 Yuri's Night		International	Public	Pos
1	3 Space Camps		USA	Youngsters	Pos
1	3 SETI at Home		USA	Youngsters	Pos
	Multi disciplinary approach				
2	3 to EO	MOE	France	Students	Pos
	SAC-C Image uses in High				
2	1 Schools	CONAE	Argentina	Students/teachers	Pos
	Brazil EDUCA Se Re				
2	Teachers Training	INPE	Brazil	Teachers	Pos
	Brazil Remote Sensing				
2	Course to Teachers	INPE	Brazil	Teachers	Pos
2	3 GLOBE	NASA	USA	Pupils, teachers	Pos
3	Planetary Geology	MOE	France	Students	Pos
3	Catch a star	EAAA	Europe	Students	Pos
	Permanent Frost				
3	Experiment	CH	CH	Students	Pos
3	Visit of Astronauts	CH	CH	Students	Pos
3	Space and society	UNESCO,CH	UNESCO,CH	Students, Teachers	Pos
	Multidisciplinary Approach				
3	on Environment	Academy of Strasbourg	F	Students	Pos
3	Animal migration study	Academy of Strasbourg	F	Students/Teachers	Pos
3	Cosmic Collage	NASDA	JPN	Students/Teachers	Pos
	Space Festival, Science				
3	Festival	CNES/DGLR	F, D	Students/Teachers	Pos
3	5 Physics on Stage	ESA, Euroforum	Europe	Teachers	Pos
3	Brazil Space Bus	INPE, AEB, CTA	Brazil	Students/teachers	Pos
3	Mexico Edu Sat System	INPE	Mexico	Teachers	Pos
	Chile Space Education				
3	Programme	University of Santiago	Chile	Teachers	Pos
	Chile Space Camp with				
3	7 Russia	INPE	Chile	Students	Pos
	EURISY PhD Summer				
3	5,6 Schools	EURISY	Europe	Students	Pos
	Space Outreach, Provincia				
3	Space Alphabetization	Salerno	Italy	Students	Pos
3	ESA Milkman space city	ESA, Euroforum	Europe	Pupils	Pos
	Development of				
4	Educational Materials	UNESCO, F, NASA	F	Students	Pos
4	5 School of Teachers	EAAE	Europe	Students	Pos

5	Brazil Course on Astronomy for teachers*	INPE	Brazil	Teachers	Pos
5	Brazil Course on Meteorology	University of Buenos Aires	Argentina	Teachers	Pos
7	Localization of collection of data	MOE	France	Students	Pos
7	Website on Mediterranean Sea for Teachers	MOE	France	Students	Neg
7	Astronomy on line	EAAA	Europe	Students	Pos
7	8 Students mentoring	AIAA	USA	Students	Pos
7	8 Brazil Teenagers Education	INPE, AEB, CTA	Brazil	Students/teachers	Pos
7	8 INPE at School lectures	INPE	Brazil	Students/teachers	Pos
8	12 Under African Skies	SGAC	SGAC/UN	Students, Teachers	Pos
8	9 Exchange	Parsec	F	Teachers	Pos

## **PILOT PROJECT PROPOSAL 1**

**Title: Space festival**

**Description:**

Any event organized for the general public and youngsters, where a space activity is proposed. It can be hands on activities or conferences or exhibits. A media coverage is given which provides a good visibility and opportunities to explain what is the use and the interest of space.

**Target group – type and quantity:**

General public with a special aim to the youngsters.

Depending on the event, it can be from some hundred to some thousands

**Means and resources:**

For a simple event, 5 to 10 people including support staff. A location from 200 square meters. Some K€. For a complex event, no limits....

**Timing for implementation:** 6 to 12 month

**Rate of difficulty of implementation:** easy

**Transferability to other countries:** very good for simple events

**Adherence to strategic objectives:** excellent

**Actors:**

Small teams of local interested people. Help of a space country to provide some resources like exhibits

**Level of decision:** national

**Training of teachers:** not applicable (except for preparation of the youngsters before the event)

**Sustainability:** good

**Evaluation of success:** number of visitors, number of media relays

**Others remarks:**

A: need, a good way to begin

B: connections with other initiatives, examples:

- Presentation of hands-on projects given at a space festival
- Visit of a space on the road give the opportunity to make a small space festival in a town

## **PILOT PROJECT PROPOSAL 2**

**Title:** UNESCO Educational platform for space literacy

**Description**

Identify source of, Collect and produce

- 1) Educational material introducing space and space culture into traditional disciplines (physics, geography, earth and natural sciences, language, mathematics, economy and management, history, ...)
- 2) Information on experiences bridging space and education already conducted and lessons learned from these experiences, including advices and road map for implementation

Make this information easily available and facilitate its use for example by contacting and visiting key deciders and teachers' teachers in various nations.

Provide a web access and an internet-based repository system with direct availability for pupils, students and teachers, particularly those who lack national relaying structures, as well as for national facilitators such as established Educational services

**Target group – type and quantity:**

- Direct contact with key deciders and the beginning of the teaching chain
- (Indirectly, virtually all pupils and young students should benefit from this initiative)
- Direct availability of educational material for teachers

**Means and resources:** 10- 50 persons including support staff; good communication facilities as well as information and digital data warehouse.

**Timing for implementation:** 2 to 10 years

- Collect existing tools, data, exercises
- Structure the network and make it operational (set the teaching chain into action)
- produce complementary tools and exercises
- update data

**Rate of difficulty of implementation:** medium

**Transferability to other countries:** very good

**Adherence to strategic objectives:** excellent

**Actors:** Very small team of international experts triggering a very large amount of resources (national teaching systems and pupils/students)

**Level of decision:** Mostly international, national relays quite necessary

**Training of teachers:** Primarily done under national and regional responsibilities; minimum direct support also provided as a complement

**Sustainability:** very good

**Evaluation of success:** Number of teachers, pupils and students benefiting from the educational material provided

**Other remarks:**

A. global need, recent need (give recent things therefore subjective priority is higher for target people)

B. Connections possible with other initiatives:

-Space educational projects and festival (3-9 months of local preparation; One week at international level for selected teams)

Space on Road, very good example, although at a limited scale (Brazil) , of the possibility of proactively preparing and diffusing space-related school material.

**PILOT PROJECT PROPOSAL 3**

**Title:** Space Road Show

To be completed

### ANNEX 3 - LIST OF PARTICIPANTS –

LastName	FirstName	EmailAddress	WorkPhone	FaxNumber	Company
AMEKRANE	Rachid	<a href="mailto:rachid.amekrane@astrium-space.com">rachid.amekrane@astrium-space.com</a>	49.421.539.4801	49.421.539.4801	Astrium GmbH
BARBOSA	Marcio	<a href="mailto:m.barbosa@unesco.org">m.barbosa@unesco.org</a>			Deputy Director - General UNESCO
BECKER	François	<a href="mailto:f.becker@noos.fr">f.becker@noos.fr</a>	33 3 88 65 54 49	33 3 88 65 54 47	International Space University
BERENGUER	Yolanda	<a href="mailto:y.berenguer@unesco.org">y.berenguer@unesco.org</a>	01 45 68 41 71	01 45 68 58 22	UNESCO Education Projects
BRACCIAFERRI	Micaela	<a href="mailto:Micaela.bracciaferri@esa.int">Micaela.bracciaferri@esa.int</a>	33 1 53 69 73 55	33 1 53 69 76 01	ESA Education Office
BROCK	Stephen	<a href="mailto:stephenb@aiaa.org">stephenb@aiaa.org</a>	703-264 7536	703-264 7551	AIAA
CHIKU	Takemi	<a href="mailto:takemi.chiku@unvienna.org">takemi.chiku@unvienna.org</a>	43 1 26060 4943	43 1 26060 5830	UN Office of Outer Space
CONTRERAS	Pierre-Louis	<a href="mailto:pierre-louis.contreras@cnes.fr">pierre-louis.contreras@cnes.fr</a>	05 61 28 29 50	05 61 28 33 15	CNES
CZERNIK	Dorothea	<a href="mailto:Dorothea.czernik@esa.int">Dorothea.czernik@esa.int</a>			ESA Education Office
DE CHIARA	Vincenzo	<a href="mailto:frag_it@yahoo.com">frag_it@yahoo.com</a>	39 338 207 1627	1 610 363 8569	SPACE OUTREACH
DESSIMOZ	Jean daniel	<a href="mailto:jean-daniel.dessimoz@eivd.ch">jean-daniel.dessimoz@eivd.ch</a>	41 24 423 23 12	41 24 425 00 50	West Switzerland University of Applied Sciences
DOETSCH	Karl				International Space University
GEHLERT	Sylvia	<a href="mailto:sylvia.gehler@wanadoo.fr">sylvia.gehler@wanadoo.fr</a>			
GOURDET	Claude	<a href="mailto:Claude.gourdet@wanadoo.fr">Claude.gourdet@wanadoo.fr</a>			Ex-IAF Executive Director in pl. Y. Beguin
GREENFIELD	Chris				High School teacher Mid Wales
GUIDI	Andrea	<a href="mailto:oceanomare@inwind.it">oceanomare@inwind.it</a>	+393387211353		Space Outreach Inc.
HASKELL	George	<a href="mailto:george.haskell@worldonline.fr">george.haskell@worldonline.fr</a>			
HOLZE	Carsten	<a href="mailto:cholze@zarm.uni-bremen.de">cholze@zarm.uni-bremen.de</a>	49 421 218 21 54	49 421 218 74 73	ZARM University of Bremen
HOOD	Valérie	<a href="mailto:valerie.hood@esa.int">valerie.hood@esa.int</a>	+33 (0) 1 47 34 00 79	+33 1 47 34 01 59	EURISY
KEMPER	Shane	<a href="mailto:shane@unsgac.org">shane@unsgac.org</a>	00 1 916 212 6203		SGAC
LAIDET	Louis	<a href="mailto:louis.laidet@cnes.fr">louis.laidet@cnes.fr</a>	01 44 76 77 47	01 44 76 76 75	CNES
MATOGAWA	Yasunori	<a href="mailto:isasero@newslan.isas.ac.jp">isasero@newslan.isas.ac.jp</a>	81 42 751 1185 81 42 759 8347	81 42 759 4251	ISAS-Director Kagoshima Space Center-Office of External Relations
MISSOTTEN	Robert	<a href="mailto:r.missotten@unesco.org">r.missotten@unesco.org</a>			Division of Earth Sciences UNESCO
NOEL	Philippe	<a href="mailto:issat@onecert.fr">issat@onecert.fr</a>	05 62 25 26 84	05 62 25 26 86	ISSAT
OCKELS	Wubbo	<a href="mailto:wubbo.ockels@esa.int">wubbo.ockels@esa.int</a>	31)71.565.3505	(31)71.565.5590	ESA
OIDA	Toshihiko	<a href="mailto:Oida.Toshihiko@nasda.go.jp">Oida.Toshihiko@nasda.go.jp</a>			Director of NASDA Bonn Office
PIGNOLET	Guy	<a href="mailto:pignolet@grandbassin.net">pignolet@grandbassin.net</a>	33 (0)1 44 76 77 09	33 1 44 76 79 59	CNES
ROS	Rosa Maria	<a href="mailto:ros@mat.upc.es">ros@mat.upc.es</a>	34 9 34137073	34 9 34137007	EAAE Vice President
SAUSEN	Tana Maria	<a href="mailto:tania@ltid.inpe.br">tania@ltid.inpe.br</a>	55 12 39456862	55 12 39456870	National Institute of Space Research INPE
SERFASS	Anne				CNES
STONE	Randy	<a href="mailto:rstone@globe.gov">rstone@globe.gov</a>	202 501 3200	202 501 5060	Senior Analyst of The GLOBE Programs
VALLERANI	Ernesto	<a href="mailto:info@spacegate-altec.it">info@spacegate-altec.it</a> <a href="mailto:michel.vauzelle@education.gouv.fr">michel.vauzelle@education.gouv.fr</a>	39 0 11 74 30 301		ALTEC Sr
VAUZELLE	Michel	<a href="mailto:v.fr">v.fr</a>	06 10 43 04 17		Education Nationale

VOLP	Jim	<a href="mailto:jim.volp@unsgac.org">jim.volp@unsgac.org</a>	31 6 48180056		SGAC Europe
WAGNER	Fernand	Fernand.wagner@education.lu			EAAE
WEBB	John	j.webb@unesco.org			Division of Basic Sciences UNESCO
WELCH	Chris	c.s.welch@kingston.ac.uk	44 20 85 47 25	44 20 85 47 7992	Kingston University
WILLEKENS	Philippe	philippe.willekens@esa.int	33-1-53697388	33-1-53697678	ESA Education Office
WOOD	Barbara	pwood@inteliport.com	1 252 482 5010	1 252 482 5010	Woods Associates
WOOD	Peter	pwood@inteliport.com	33 88 65 54 30	33 88 65 54 47	ISU