

UNITED NATIONS
Office for Outer Space Affairs

The United Nations Basic Space Technology Initiative (BSTI)

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10 June 2010 United Nations Office for Outer Space Affairs 1

Abstract

There has been considerable progress in the operational use of space technology and its applications following the organization of the **Third United Nations Conference on the Peaceful Uses of Outer Space (UNISPACE III)**, held in 1999. Today space-based assets such as Earth Observation, global navigation and telecommunication satellites are progressively more integrated into public infrastructures and decision-making processes and support a wide range of applications for economic and sustainable development.

The increasing affordability of the development of small satellites together with their growing capabilities has raised the interest in many countries that formerly were primarily users of space applications to establish certain indigenous capacities in basic space technology. Taking account of this trend, the United Nations has recently launched the **Basic Space Technology Initiative (BSTI)** in the framework of its **Programme on Space Applications**.

The Initiative is organizing a series of activities with the aim to support Member States in establishing a basic space technology capacity. This year's United Nations Austria/European Space Agency Symposium on Small Satellite Programmes for Sustainable Development, to be held in Graz, Austria, from 21-24 September, will, for example, consider the design, development and operation of small satellite payloads. Further activities under consideration include the compilation of an education directory of world-wide academic programmes in aerospace engineering and small satellite development, the development of an education curriculum for basic space technology and cooperation with educational institutions to identify relevant long-term fellowship opportunities.

It is anticipated that UNBSTI will create new opportunities for international space cooperation and contribute to further promoting the beneficial use of space technology and its applications.

Contents

- The United Nations and Outer Space
- Capacity Building in Space Science and Technology Education
- The United Nations Basic Space Technology Initiative



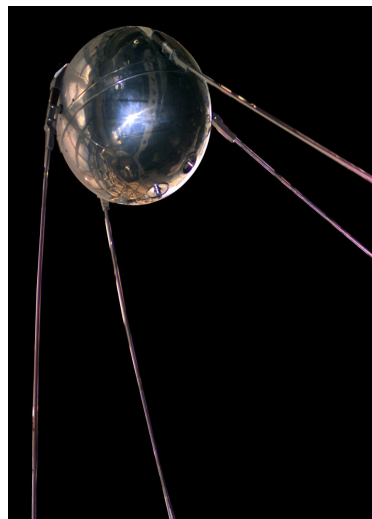
10 June 2010

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3

The United Nations and Outer Space

- 4 October 1957: Beginning of the space age with the launch of Sputnik-I
- Concerns over an arms race and the need for rules to regulate the activities of States in outer space
- 1958: United Nations General Assembly establishes the **Committee on the Peaceful Uses of Outer Space (COPUOS)**
- Outer space to be used for peaceful purposes only and for the benefit of mankind



10 June 2010

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4

The United Nations and Outer Space

- COPUOS Subcommittees
 - Scientific and Technical Subcommittee (STSC)
 - Legal Subcommittee (LSC)
- Growing number of COPUOS member States (69) and organizations with permanent observer status (26)
- Meet annually in Vienna and report to the General Assembly in New York
- General Assembly adopts resolution on “International cooperation in the peaceful uses of outer space”
- Serviced by the **United Nations Office for Outer Space Affairs**

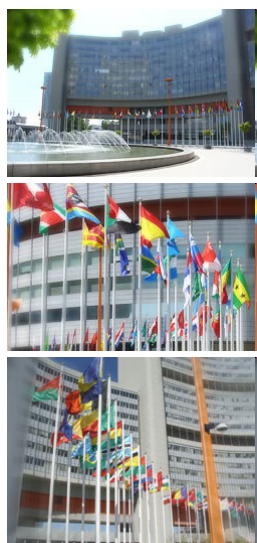


10 June 2010

United Nations Office for Outer Space Affairs

5

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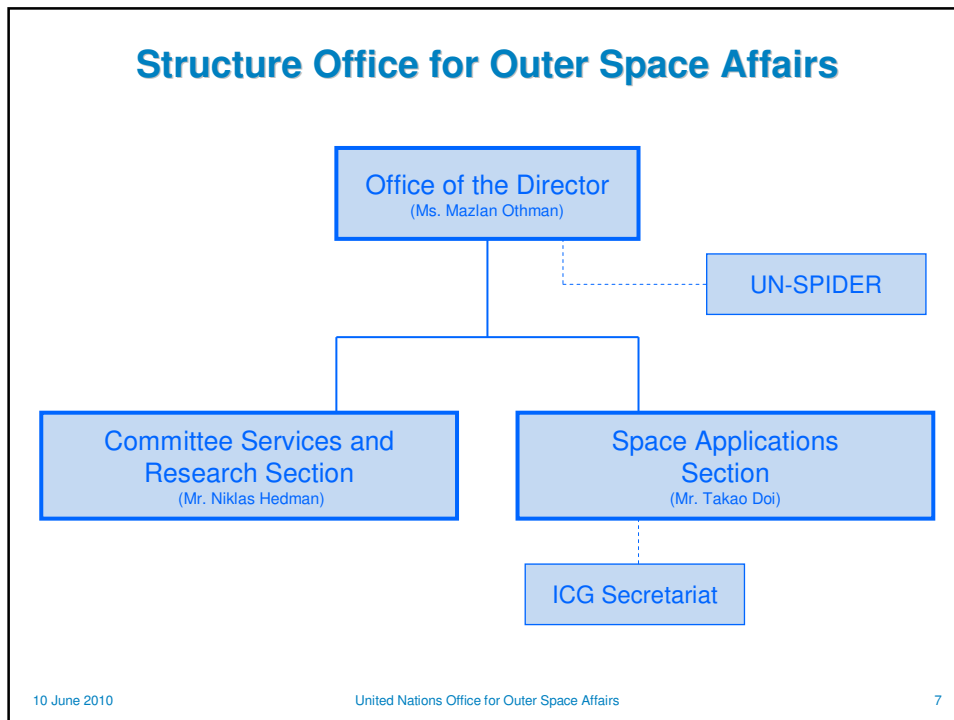


- Established 1962 as a unit within the Department of Political and Security Council Affairs and transformed into the **Office for Outer Space Affairs (UNOOSA)** in 1992
- Originally located at the United Nations Headquarters in New York, became part of the United Nations Office Vienna in 1993
- Implements the **United Nations Programme on Space Applications** and acts on recommendations of the **UNISPACE conferences** held in 1968, 1982 and 1999

10 June 2010

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6



United Nations Programme on Space Applications

- Established in response to recommendations of the first UNISPACE conference, held in 1968
- Became operational in 1971
- **United Nations Expert on Space Applications**
- UNISPACE'82, held in 1982, and UNISPACE III, held in 1999, further expanded the mandate of the Programme

<http://www.unoosa.org/oosa/en/SAP/history.html>

10 June 2010 United Nations Office for Outer Space Affairs 8

Mandate Programme on Space Applications

- **Promotion of greater cooperation ... in space science and technology** between industrialized and developing countries as well as among developing countries;
- Development of a **fellowship programme for in-depth training** of scientists, technologists and applications specialists ... ;
- **Organization of seminars** on advanced space applications and new system developments for managers and leaders of **space applications and technology development activities** as well as seminars for users in specific applications;
- **Stimulation of the growth of indigenous nuclei and an autonomous technological base**, to the extent possible, in space technology in developing countries with the cooperation of other United Nations agencies and/or Member States or members of the specialized agencies;
- **Dissemination of information on new and advanced technologies and applications**, with emphasis on their relevance and implications for developing countries; and
- Provision of **technical advisory services** on space applications projects, upon request by Member States or any of the specialized agencies.

<http://www.unoosa.org/oosa/en/SAP/mandate.html>

10 June 2010

United Nations Office for Outer Space Affairs

9

Achievements Programme on Space Applications



- ~11,000 people participated in more than 200 activities (workshops, seminars, training courses...)
- ~300 specialists, selected from among ~1500 applicants, participated in various long-term fellowships programmes
- Establishment of four **Regional Centres for Space Science and Technology Education, affiliated to the United Nations**

<http://www.unoosa.org/oosa/en/SAP/accompl.html>

10 June 2010

United Nations Office for Outer Space Affairs

10

Regional Centres, affiliated to the United Nations

Latin America and the Caribbean
Brazil (CRETEALC)
Mexico (CRETEALC)

Africa
Morocco (CRASTE-LF)
Nigeria (ARCSSTE-E)

Asia and the Pacific
India (CSSTEAP)

10 June 2010 United Nations Office for Outer Space Affairs 11

United Nations Education Curricula

- Education curricula have been developed for
 - Remote Sensing and Geographical Information Systems
 - Satellite Communications
 - Satellite Meteorology and Global Climate
 - Space and Atmospheric Sciences as well as data management
 - In preparation: Space Law, GNSS

<http://www.unoosa.org/oosa/en/SAP/centres/index.html>

10 June 2010 United Nations Office for Outer Space Affairs 12

Capacity Building in Space Technology

- **Interest to establish capabilities for basic space technology development** in a growing number of countries
- **Increasingly capable small satellites** can be developed with an infrastructure and at a cost that is now also **affordable to universities and smaller institutions**
- University-based small satellite projects have led to the **establishment of small and medium-sized space enterprises** that are now marketing their products on a commercial and world-wide basis
- Such developments can **create new opportunities for international space cooperation** and can **contribute to further promote the use of space technology and its applications**

10 June 2010

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13

Small Satellite Activities

- **Small satellites have been addressed by the Committee on the Peaceful Uses of Outer Space since the mid-1990s**
 - Microsatellites and Small Satellites: Current Projects and Future Perspectives for International Cooperation, 2 November 1995 (A/AC.105/611)
 - Symposium on Utilization of Micro- and Small Satellites for the Expansion of Low-cost Space Activities, Taking into Account the Special Needs of Developing Countries, 12-13 February 1996 (A/AC.105/638)
 - Report on the United Nations/Instituto Nacional de Técnica Aeroespacial/European Space Agency International Conference on Small Satellites: Missions and Technology, Madrid, 9-13 September 1996 (A/AC.105/645)
- **UNISPACE III: UN/IAA Workshop on Small Satellites**
 - UNISPACE III, "Report of the Technical Forum", 28 July 1999 (A/CONF.184/L.13)
 - UNISPACE III, Technical Forum, "Conclusions and proposals of the Workshop on Small Satellites at the Service of Developing Countries", 27 July 1999 (A/CONF.184/C.2/L.7)

Documents available from <http://documents.un.org>

**THIRD UNITED NATIONS CONFERENCE
ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE**

10 June 2010

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14

UN/IAA Workshop Series on Small Satellites

Date	Location	Special theme	Reports
5 October 2000	Rio de Janeiro, Brazil	The Latin American Experience	A/AC.105/745
2 October 2001	Toulouse, France	The African Perspective	A/AC.105/772
12 October 2002	Houston, USA	Beyond Technology Transfer	A/AC.105/799
30 September 2003	Bremen, Germany	A Contribution to Sustainable Development	A/AC.105/813
5 October 2004	Vancouver, Canada	Current and Planned Small Satellite Programmes	A/AC.105/835
19 October 2005	Fukuoka, Japan	-	A/AC.105/855
3 October 2006	Valencia, Spain	-	A/AC.105/884
25 September 2007	Hyderabad, India	-	A/AC.105/897
30 September 2008	Glasgow, Scotland	-	A/AC.105/943
13 October 2009	Daejeon, Republic of Korea	-	A/AC.105/971

Documents available from <http://documents.un.org>

10 June 2010

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15

Basic Space Technology Initiative (BSTI)

- **Mission**
 - To enhance access to space application tools for sustainable development through building capacity in basic space technology
- **Objectives**
 - Respond to the growing **interest in many countries to establish indigenous capacities in basic space technology**
 - Address the **growing role of small satellites** for education, basic space science and for operational applications
 - Assist countries to assure **adherence to the relevant regulatory frameworks** (registration of space objects, frequency allocation, space debris mitigation guidelines...)
 - Promote the **use of standards**
 - Promote **international cooperation and information exchange** in capacity building in basic space technology

10 June 2010

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16

BSTI Work Programme

I. Foundations

- Workshops/Seminars on Basic Space Technology
- BSTI Website (<http://www.unoosa.org/oosa/en/SAP/bsti/index.html>)
- BSTI Mailing List

II. Regional Conferences

- BSTI conferences in the regions that correspond to the United Nations Economic Commissions for Africa, Asia and the Pacific, and Latin America and the Caribbean

III. Education Curriculum

- Survey of Aerospace Engineering and Small Satellite Programmes (<http://www.unoosa.org/oosa/en/SAP/bsti/bsti-education/index.html>)
- Development Space Technology Education Curriculum

IV. Long-term Fellowship Programmes

V. Pilot Projects

10 June 2010

United Nations Office for Outer Space Affairs

17

UN/Austria/ESA Symposium 2009-2011

UNITED NATIONS
AUSTRIA
EUROPEAN SPACE AGENCY
SYMPOSIUM
2009-2011

Small Satellite Programmes
for Sustainable Development
"Payloads for Small Satellite Programmes"

21-24 September, 2010
Graz, Austria

Sponsored by the Federal Ministry for European and International Affairs • Federal Ministry for Transport, Innovation and Technology • City of Graz • State of Styria • European Space Agency

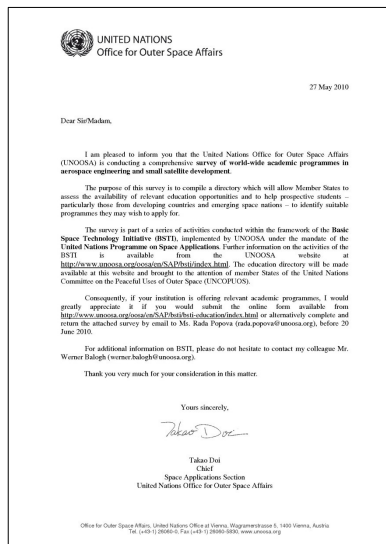
<http://www.unoosa.org/oosa/en/SAP/act2010/graz/index.html>

10 June 2010

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18

UN Education Directory: Aerospace Engineering



<http://www.unoosa.org/oosa/en/SAP/bsti/bsti-education/index.html>

10 June 2010

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19

BSTI and Regulatory Aspects

- **Under international law, international registration and regulatory frameworks for satellites exist**
- **1968 Outer Space Treaty**
 - States “bear international responsibility for national activities in outer space...whether such activities are carried on by governmental agencies or by non-governmental entities” (Article VI)
 - States are “internationally liable for damage” caused by their space objects (Article VII)
- **1972 Liability Convention**
 - Absolute liability (Article II), Fault liability (Article III)
 - Joint and several liability (Article IV)
- **1976 Registration Convention**
 - Identifies which nation is the “State of registry” for a satellite (Article II)
- **ITU Radio Regulations, *inter alia*, require mandatory regulatory procedures for frequency allocations for satellites**
- **Space Debris Mitigation Guidelines** See Official Records of the General Assembly, Sixty-second Session, Supplement No. 20 (A/62/20), paras. 117 and 118 and annex, and http://www.unoosa.org/pdf/gadocs/A_62_20E.pdf

10 June 2010

United Nations Office for Outer Space Affairs

20

BSTI and Regulatory Aspects

- **With the increase of small satellites, it is important that international registration and regulatory frameworks are complied with**
- **Why?**
 - International responsibility and liability in accordance with international space law
 - Satellite registration identifies the State responsible for a satellite
 - Self-interest: *inter alia*, frequency registration protects used-frequencies from interference and conflicts from other satellites
- **How?**
 - **ITU Master International Frequency Register** (maintained by ITU)
 - Website: <http://www.itu.int/ITU-R/space/support/index.html>
 - **United Nations Register of Objects Launched into Outer Space** (maintained by UNOOSA)
 - Website: <http://www.unoosa.org/oosa/en/SORegister/index.html>

10 June 2010

United Nations Office for Outer Space Affairs

21

Conclusions

- Growing world-wide interest in developing capabilities in developing basic space technology, particularly in the utilization of small satellites
- BSTI will reach out regionally and internationally to organize activities for education and applications on small satellite technology
- Following past achievements of the Programme on Space Applications, BSTI aims at developing an education curriculum on basic space technology
- In cooperation with ITU, the BSTI will promote the implementation of requirements of international registration and regulatory frameworks for satellites

10 June 2010

United Nations Office for Outer Space Affairs

22

Thank you for your attention!

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The Role of Technology

- “Technology has been the main force behind the long-term increases in income in the rich world ... “
(Jeffrey D. Sachs, “The End of Poverty”, p. 31)
- “When India created its Indian Institutes of Technology in the 1950s and 1960s, development experts expressed scepticism that such advanced and rarefied educational programs really belonged in such an impoverished country. Decades later we see the remarkable fruit of those investments in scientific research capacity.”
(Jeffrey D. Sachs, “The End of Poverty”, p. 258)

Jeffrey D. Sachs, “The End of Poverty – Economic Possibilities of Our Time”
Penguin Books Ltd, 2006, ISBN 0 14 30.3658 0