IU3. Committee on Space Research (COSPAR)

Report to the 2008 IUPAP General Assembly

Mandate

The Committee on Space Research (COSPAR) was established by the International Council for Science (ICSU) in 1958, at the beginning of the space age, as an interdisciplinary scientific organization, with the focus on the progress of all kinds of research carried out with the use of space means (including balloons). It celebrated its 50 th anniversary in 2008.

COSPAR's objectives are to promote on an international level scientific research in space, with emphasis on the exchange of results, information and opinions, and to provide a forum, open to all scientists, for the discussion of problems that may affect scientific space research. These objectives are achieved through the organization of biennial Scientific Assemblies, publications and other means.

COSPAR's membership encompasses 44 National Scientific Institutions and 13 International Scientific Unions. From the point of view of IUPAP, COSPAR is a highly physics based organization. Most of the scientists present have a background in the discipline either as Physicists or Applied Physicists. Sensor technology and indeed spacecraft performance (pointing, positioning, thermal response, stability etc.) all rely heavily on physics as an underlying discipline. Much of the physics addressed by COSPAR is Earth sciences (including effectively all the disciplines of geophysics undertaken by remote means), astrophysics, planetary physics, space plasma physics as well as life, material and fundamental science in space.

COSPAR is a very effective body in bringing together practitioners in the various disciplines of space research and from a large number of countries. Its Scientific Assemblies provide an excellent forum for scientists to describe current activities, to learn about other space science programs, and to engage in cooperation with international colleagues. The Assemblies permit space scientists to learn about activities relating to both their own area of specialty and to those from other overlapping disciplines.

COSPAR which is the only pan-national organization devoted to discussing the broad spectrum of space research activities, is expected to continue to play a useful role in defining and coordinating the direction of space research in the future. In a world where space activities are dominated by a few large countries or regions, COSPAR's role is particularly relevant for countries with intermediate and small programs to develop their interests and plans.

For more details see COSPAR's web site: http://cosparhq.cnes.fr/

Scientific Assemblies

COSPAR held its most recent (37 th) Scientific Assembly in Montreal, Canada in July 2008. Approximately 2,400 persons participated in the Assembly. 94 core scientific events, covering all branches of space research, were scheduled. The scientific program was structured in oral and dedicated poster sessions. The successful morning interdisciplinary lectures were continued, and special lunch time presentations interspersed. All business meetings were held in the evenings to meet the demands for more discussion time. The student program was significantly expanded, bringing more than 50 students to Montreal, a strong increase compared to the previous two Assemblies. Organized in 2004 and 2006 By the European Space Agency (ESA) only, the 2008 student program was organized for the first time by the International Space Education Board (ISEB) which currently includes the American, Canadian, Japanese, and French space agencies. The student program participants also benefited from a 'value-added' program such as specific educational activities arranged on site. It is to be noted that many students (about 230 in 2008), generally

more advanced in their studies and often recipients of partial support from COSPAR, participate in the Assembly outside the ISEB student program. The public had the opportunity to attend a lecture on the most recent Mars science results and an outdoor extension of the Assembly with a full-scale model of the James Webb Space Telescope on display. An Academy Day organized by the International Academy of Astronautics (IAA) was also held on the occasion of the Scientific Assembly. In addition, the United Nation Office for Outer Space Affairs (UN-OOSA) organized a day-long Expert Meeting on Global Navigation Satellite Systems and Services for the International Committee on Global Satellite Systems (ICG). Both events were open to all interested Assembly participants.

The COSPAR Space Science Award went to Georges Gloeckler and Ken Pounds. A number of other awards, some joint with other Academies of Sciences or space agencies, were also bestowed**.** For the first time awards for outstanding papers of young scientists were conferred.

The 2008 Assembly included a celebration of the 50th anniversary of COSPAR. In three high level presentations the importance of space research and international cooperation over the past fifty years was highlighted. It was also shown how space research in the international environment will continue to inspire challenging and beneficial science activities for the future of humanity.

The next (38 th) COSPAR Scientific Assembly will be held in Bremen, Germany on 18-25 July 2010 and the 39 th Assembly in Mysore, India in 2012.

Recent activities

COSPAR underwent a process of 'Reflection on its Future'. This self-examination was carried out as a means of exploring what COSPAR has done well in the past and where COSPAR should be going in the future at a moment when major changes on the international space science scene are occurring or are expected. Many of the resulting recommendations were successfully implemented in the recent Scientific Assembly.

COSPAR's vision or mission in the next years is to 'expand the knowledge frontier of space for the benefit of humankind'. As one of the outcomes of this reflection process, a COSPAR Scientific Advisory Committee (CSAC) was formed to pursue this broad vision and to monitor progress. The scope of the CSAC is broad, focusing on essential issues of space science and society. CSAC reports to the Bureau. Its mandate, loosely defined, is:

- *to review the evolution of space research and the international context over the time frame of twenty years,*
- *to compile the visions of the main space organizations,*
- *to advise COSPAR how to best fulfill its mission and respond to the needs of the science community and of society,*
- *to analyze and suggest new approaches to international cooperation, and*
- *to analyze the way COSPAR executes its vision and suggest improvements /modifications to its structure and the possible setting-up of new tools.*

The CSAC membership is comprised of the COSPAR President, Vice Presidents, a small number of distinguished invitees, the Scientific Commission Chairs, and representatives from ICSU and UNESCO. The presence of the SC chairs recognizes the preeminence of science in COSPAR and responds to the need, identified in the reflection process, to improve communication between Commissions and the Bureau. ICSU participation will, it is hoped, help to deepen exchanges between COSPAR and its parent body. The ICSU member is considered to represent many of the organizations with which COSPAR deals, not least of which are the Committee's Scientific Union members.

Space agencies represent the 'executive arm' of space research. Therefore, it is essential that agencies are interested in COSPAR activities. Agencies also benefit from COSPAR, e.g. planetary protection guidelines, models, standards, etc. The process of reviewing the common interests between COSPAR and space agencies is continuous. COSPAR recently set up a Panel on Exploration. Its objective is to provide independent scientific advice to support the development of exploration programs and to safeguard the potential scientific assets of solar system objects. At future COSPAR Assemblies a Space Agency Round Table Event is also expected to be organized.

In recent years, COSPAR's program of Capacity Building has been considerably extended. A series of regional workshops were organized in Brazil (astronomy), India (astronomy), China (magnetospheric physics), South Africa (astronomy) and Morocco (space oceanography) in 2001 to 2005. In 2007 two workshops were held in Romania (Solar-Terrestrial Interactions) and in Uruguay (Planetary Science). In 2008 workshops took place in Egypt on Space Astrophysics and in Malaysia on Space Optical and UV Astronomy. These workshops were co-sponsored and financially supported by e.g. member Scientific Unions, ESA, the UN, and national scientific entities. Another regional workshop is scheduled in China on Lunar and Planetary Surface Science (September 2009). Proposals for further workshops are under discussion.

In light of the success of the Capacity Building workshops a follow-on fellowship program has been created - on a two year trial basis – open to young scientists who were participants at one of these workshops to enable them to build on skills gained at the workshop. The program provides for visits of two to four weeks for the purpose of carrying out joint research in a select number of laboratories which collaborate with COSPAR in this program.

One of the goals of the Committee's Panel on Capacity Building (PCB) is to develop workshops that can be held in several areas of the world in order to extract the most benefit from them. To date International Scientific Union partners include the IAU, URSI, IUGG/IAGA, and ISPRS. COSPAR would welcome other partners and topics in an effort to cover all disciplines represented in COSPAR. The PCB also made efforts to build relationships with United Nations Educational, Scientific and Cultural Organization (UNESCO), UN-OOSA, the Academy of Sciences for the Developing World (TWAS) and other organizations that benefit space scientists from developing countries. In addition, the PCB is charged with addressing more broadly relevant North-South issues and thought will be given to how to ensure participation by developing country scientists in the Assemblies. Efforts are also underway to promote improving coordination and cooperation among various international and intergovernmental organizations that have their own capacity building programs in space science and technology.

Possible ways for IUPAP involvement in COSPAR activities in the near-term future are: award nominations and nomination of officers, proposals for co-sponsorship of future capacity building workshops, co-sponsorship of the Scientific Assembly 2010 with a modest contribution to the grants program which provides partial support to young scientists and those from developing or economies in transition countries.

Publications

COSPAR maintains various means of communication with the scientific community and its wider membership. COSPAR's *web* address is given above. *Advances in Space Research (ASR)* is the flagship for the COSPAR community. The journal is now open to all submissions and fully refereed, covering all areas of space research. Its editorial structure has correspondingly been adapted. *Space Research Today* is a key tool in communication of information within the COSPAR community. This information bulletin provides COSPAR Associates and others with articles on current topics in space research by practitioners in the field, regular information on meetings, COSPAR and space-related news and other topics of interest to the community. It is issued three times a year.

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