

IU3. Committee on Space Research (COSPAR)

Report to the IUPAP General Assembly 2011

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). The Committee celebrated its 50th anniversary in 2008.

COSPAR's mission or vision is *Expanding the knowledge frontier of space for the benefit of humankind*. Its 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 45 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 (38th) Scientific Assembly in Bremen, Germany in July 2010. More than 3,400 persons participated in the Assembly, making the Bremen Assembly the most successful ever, at least in terms of numbers. The Assembly included 104 core scientific events, covering all branches of space research. 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 organized by the International Space Education Board (ISEB) was continued. The ISEB members contributing to the Student Program at COSPAR Assemblies are currently the American, Canadian, Japanese, and European space agencies. The ISEB Student Program participants benefit from a 'value-added' program such as specific educational activities arranged on site, not to mention complete sponsorship. It is to be noted that many students (about 540 in 2010), 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 cosmological research which drew approximately 1000 participants, the exhibition with displays from space agencies, industry and publishing companies, and several other smaller events. An Academy Day organized by the International Academy of Astronautics (IAA), open to all interested Assembly participants, was also held on this occasion.

In 2010 COSPAR Space Science Awards went to Guenther Hasinger and Steven W. Squyres. A number of other awards, some joint with other Academies of Sciences or space agencies, were also bestowed. For the second time awards for outstanding papers of young scientists were conferred. The COSPAR Council elected Professor G. Bignami as President of COSPAR for the period 2010-2014, following Professor R.-M. Bonnet who had successfully presided the Committee for eight years.

The next (39th) COSPAR Scientific Assembly will be held in Mysore, India on 14-22 July 2012 and the 40th Assembly in Moscow, Russia on 02-10 August 2014.

Recent activities

COSPAR's Scientific Advisory Committee (CSAC) pursues COSPAR's broad vision and monitors progress. Its scope is broad, focusing on essential issues of space science and society. The CSAC reports to the Bureau, and 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 Scientific Commission (SC) chairs recognizes the preeminence of science in COSPAR and responds to the need for communication between the 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. To this end several years ago COSPAR 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. COSPAR published in June 2010 the Panel's report 'Toward a Global Space Exploration Program: A Stepping Stone Approach'. Along the same lines but in a different field, COSPAR recently constituted with the IAU a joint Working Group on the Future of Space Astronomy to address the looming dearth of space-based astronomy missions. The Working Group's report is due to be published in the coming months.

One of the goals of the Committee's Panel on Capacity Building (PCB) has been to develop workshops that can be held in several areas of the world in order to extract the most benefit from them. This program of Capacity Building flourishes. The successful series of regional workshops was continued in 2009 in China (Lunar and Planetary Surface Science) and in 2010 in India (Data Analysis of the Fermi Gamma-Ray Space Telescope) and Brazil (Earth Understanding of the Water Cycle). This year (2011) workshops have been held in India (Remote Sensing of Aerosols and their Impact), in Argentina (Data Analysis of the XMM-Newton, Chandra, and Suzaku X-ray Missions) and in South Africa (Advanced Land Surface Characterization). These workshops were generally co-sponsored and financially supported by e.g. member Scientific Unions, ESA, the UN, and national scientific entities. Proposals for further workshops are under discussion.

In light of the success of the Capacity Building workshops the follow-on fellowship program has now been firmly established. It is 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.

To date International Scientific Union partners in COSPAR's Capacity Building program 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 the 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 improved 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 to be involved in COSPAR activities in the near-term future are: award nominations and nomination of officers, proposals for and/or co-sponsorship of future capacity building workshops, co-sponsorship of future Scientific Assemblies with a modest contribution to the grants program which provides partial support to young scientists and those from developing or economies in transition countries.

COSPAR has also experimented recently with events for the general public on space science related topics. In 2010 a well-received symposium on 'The Contribution of Space Science to Astronomy' (organized in the context of the closing of the International Year of Astronomy) and in 2011 a similar event on 'Ocean and Climate Seen from Space' were held in Paris, France. It is planned to organize similar events in future non-Assembly years in Paris, and it is hoped that these symposia, open to the public, may be "exported" to other countries if a suitable host institution expresses interest.

The possibility of holding 'odd-year events' beginning in 2013 is being studied in order to offer to countries with small to medium-size space programs opportunities to host a COSPAR event, while avoiding undesirable competition with the Scientific Assembly or with partner organizations' events. These new events would be smaller than the Assembly, and focused on multidisciplinary topics not fully covered so far, e.g. space science and education, the relationship between scientists and people involved in space technology (experimentalists, instrumentalists), outreach, etc. Following consultation, the following cross-cutting theme has been suggested for the first such event: "Planetary systems, both of our Sun and other stars." A call for members of the organizing committee has been circulated, and COSPAR member countries have been approached to consider hosting the event with responses expected by 31 October 2011.

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 open to all relevant submissions and fully refereed. Covering all areas of space research, its editorial structure has been correspondingly 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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