

IU3. Committee on Space Research (COSPAR)

Report to IUPAP

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 to expand 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, Capacity Building workshops and various meetings, publications and other means.

COSPAR's membership encompasses 46 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 (39th) Scientific Assembly in Mysore, India in July 2012. More than 2100 scientists, students, exhibitors and press participated in the Assembly, making the Mysore Assembly the largest and most successful COSPAR congress held to date in Asia. The Assembly included 114 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. All business meetings were held in the evenings to allow for sufficient discussion time.

The Inauguration of the Assembly began with a Space Agency Round Table, entitled 'Space Vision - 2020 and Beyond'. It was followed by opening addresses including that of Giovanni Bignami, the President of COSPAR, and the awards ceremony. The 2012 COSPAR Space Science Award went to Janet Luhmann, the COSPAR International Cooperation Medal to the former COSPAR President Roger-Maurice Bonnet for his efforts in promoting international cooperation for more than 30 years, and the COSPAR Distinguished Service Medal to Peter Willmore, the driving force behind COSPAR Capacity Building activities. A number of other awards, some joint with other Academies of Sciences or space agencies, were also bestowed. For the third time awards for outstanding papers of young scientists were conferred.

Due to budget cutbacks at sponsoring space agencies, the Student Program organized by the International Space Education Board (ISEB) in recent years, was discontinued for the 2012 COSPAR Assembly. It is to be noted, however, that many students (345 in 2012), generally 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, at the University of Mysore, a lecture on Exoplanets which was followed by approximately 1000 locals, 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.

The next (40th) COSPAR Scientific Assembly will be held in Moscow, Russia on 2-10 August 2014 and the 41th Assembly in Istanbul, Turkey in 2016.

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 should 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 also sponsors the development of scientific 'roadmaps'. Its Panel on Exploration, set up to provide independent scientific advice to support the development of exploration programs and to safeguard the potential scientific assets of solar system objects, had published its report 'Toward a Global Space Exploration Program: A Stepping Stone Approach' in 2010. Along the same lines but in a different field, COSPAR 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 was presented at the recent Assembly. Much interest was voiced in producing additional roadmaps on a variety of topics. The next roadmap, led by the Panel on Space Weather (PSW), will concern space weather science and hopefully be ready for presentation at the 2014 Assembly. A proposal for a roadmap concerning atmospheric science is being developed.

The prime goal 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: since the Bremen Assembly in mid-2010 six more regional workshops were held, totaling their number to 18 since its start eight years ago. These took place in late 2010 in Brazil (Earth Observation Understanding of the Water Cycle), in 2011 in India (Remote Sensing of Aerosols and their Impact), Argentina (Data Analysis of the XMM-Newton, Chandra, and Suzaku X-ray Missions) and South Africa (Advanced Land Surface Characterization), and 2012 in China (Remote sensing of Global Water Circulation and Climate Change) and most recently again in Argentina (Infrared and Submillimetre Astronomy). *These workshops were generally co-sponsored and financially supported by e.g. member Scientific Unions, ESA, the UN, and national scientific entities.* The increase in the number of workshops from an average of three in a two-year period to four was possible thanks to a grant from ICSU. COSPAR hopes to maintain and even slightly increase this rhythm and has augmented the amount of the Committee's budget devoted to these activities in future years. Two workshops are in the planning phases for 2013.

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 (now about 20) which collaborate with COSPAR in this program. Since 2008 26 fellowships have been organized with 18 of them since the 2010 Assembly.

To date International Scientific Union partners in COSPAR's Capacity Building program include the IAU, URSI, IUGG/IAGA, and ISPRS. Efforts are continuing to promote improved coordination and cooperation among various international and intergovernmental organizations that have their own capacity building programs in space science and technology. For example, a collaborative agreement on capacity building and outreach was signed in 2012 with the World Meteorological Organization (WMO) Space Program. COSPAR welcomes other partners and topics in an effort to cover all disciplines represented in COSPAR.

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.

The proposal of holding a 'COSPAR event' in non-Assembly years in a country with a small- to medium-size space program has been accepted. This new type of event aims to promote space research at a regional level, will be smaller than the Assembly, will focus on multidisciplinary topics not fully covered so far and will be held every two years in a different part of the world. The first COSPAR Symposium on 'Planetary Systems of our Sun and other Stars, and the Future of Space Astronomy' will take place in Bangkok, Thailand, 11-15 November 2013. A co-located Capacity Building workshop will be organized in the preceding week. See www.cospar2013.gistda.or.th

In recent years COSPAR also experimented 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' was held in Paris, organized in the context of the closing of the International Year of Astronomy (IYA). The public outreach symposium on 'Ocean and Climate seen from Space', held at Universcience in Paris in April 2012, was less well attended than expected. It was therefore decided that future events could be organized in favorable contexts, as was the case with the event at the closure of the IYA.

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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