

INTERNATIONAL HELIOPHYSICAL YEAR (IHY)

URL: <http://ihy.gsfc.nasa.gov>

Heliophysics: A branch of science dealing with the physical processes and phenomena occurring in the Sun-Heliosphere-Earth connected system.

Contacts:

Joseph M. Davila, NASA-GSFC, Code 682, Greenbelt, MD 20771 USA, 301-286-8366, Joseph.M.Davila@nasa.gov

Richard Harrison, Rutherford Appleton Laboratory, Didcot Oxfordshire, 44-12-35446884, R.A.Harrison@rl.ac.uk

Barbara Thompson, NASA-GSFC, Code 682, Greenbelt, MD 20771 USA, 301-286-3405, thompson@eitv3.nascom.nasa.gov

Nat Gopalswamy, NASA-GSFC, Code 695, Greenbelt, MD 20771 USA, 301-286-5885, gopals@fugee.gsfc.nasa.gov

INTRODUCTION

In 1957 a program of international research, inspired by the International Polar Years of 1882-83 and 1932-33, was organized as the International Geophysical Year (IGY) to study global phenomena of the Earth and geospace. The IGY involved about 60,000 scientists from 66 nations, working at thousands of stations, from pole to pole to obtain simultaneous, global observations on Earth and in space. There had never been anything like it before. The fiftieth anniversary of the International Geophysical Year will occur in 2007. We propose to organize an international program of scientific collaboration for this time period called the International Heliophysical Year (IHY). Like its predecessors, the IHY will focus on fundamental global questions of Sun-Earth connected science employing new physical processes discovered since the IGY.

The overarching objective of the IHY is to discover the physical mechanisms at work which couple the Earth to events from the heliosphere. It has been obvious for some time that events on the Sun can affect geospace, and even the Earth's climate. The systematic global study of this connection is to be the central theme of the IHY. In view of these aims, the following objectives are proposed for the IHY.

OBJECTIVES

In order to achieve the overarching goal of discovering the physical mechanisms at work which couple the Earth to events from the heliosphere the IHY is envisioned as an international project with the following specific objectives:

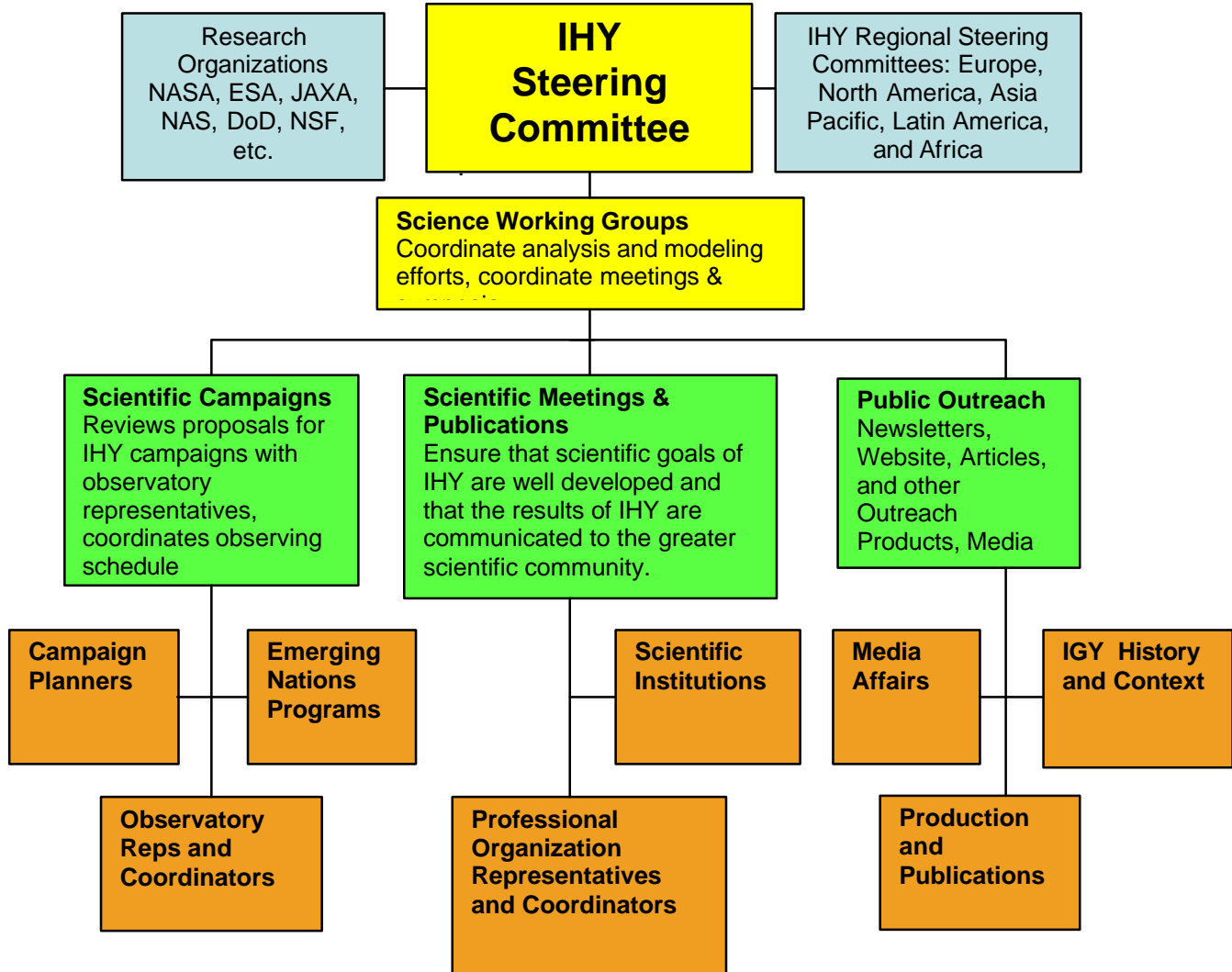
- To obtain a coordinated set of benchmark observations to study on Heliophysical scales, the solar-generated events which affect life and climate on Earth

- To document and report these observations, and provide a forum for the development of new scientific results utilizing these observations
- To foster international cooperation in the study of Heliophysical phenomena now and in the future
- To communicate the unique scientific results of the IHY to the scientific community as well as to the world population

ORGANIZATION

The IHY organization is developed in response to the goals and objectives of IHY. An International Steering Committee coordinates all of the IHY activities, through its Science Working Groups. Science Working Groups coordinate analyses and modeling efforts, and are responsible for planning IHY meetings, symposia and workshops through the three major thrusts:

Details of the planned organization are shown in the following diagram.



Scientific Campaigns

Oversees the IHY coordinated observing campaigns. The SWG team reviews proposals for IHY campaigns, coordinates the input from the observatory representatives, and maintains the IHY observing and campaign schedule. Campaign proposers and planners develop plans for a broad range of scientific observing campaigns and propose campaigns to the Science Working Groups. Campaigns are coordinated between the science working groups, observatories, and emerging nations programs primarily through electronic communication. Observatory representatives and coordinators participate in the review observing proposals, identifying and committing observatory resources if necessary, and executing observing campaigns. They determine whether an observation is feasible, and represent their observatory when committing to an observing schedule. International participation is encouraged by establishing contacts with and identifying resources for programs in developing countries, i.e. "*Putting the 'I' in IHY.*"

Scientific Meetings and Publications

Arranges for the communication of scientific results to broader science community. Scientific Institutions coordinators serve as a point of contact for an institution, establish websites for local coordination, develop outreach programs, and may assist in coordination of developing countries program. Professional Organization representatives and coordinators work to ensure synergy and identify overlaps between the goals of their organizations and the goals of IHY. In addition to serving as contact points, they help organize special sessions on IHY science, coordinate publications through journals, and help plan campaigns that address the science goals of their organization.

Public Outreach

This group is responsible for increasing public awareness of IHY activities. This committee produces newsletters, maintains the website(s), writes articles, coordinates media affairs, and develops outreach products. Media Affairs develops materials for and works directly with media organizations to ensure that the activities and opportunities of IHY are broadly communicated. The IGY History and Context group helps the IHY initiative plan for the future by learning from IGY's past successes, and serves as an inspiration for 2007. Contributions of "IGY reminiscence" articles are posted on the website and, if possible, will be bound into a single historical volume. Production and Publications will focus on the educational and public website and other forms of information, production of materials and publications intended for public outreach.

COORDINATING SCIENTIFIC CAMPAIGNS

The science goals of the IHY are broad and require innovative research programs, and the coordinated effort of observatories and scientists worldwide. However, the support of a large number of these programs can strain existing resources.

The IHY Scientific Campaigns will be facilitated through the Science Working Groups, which will stimulate campaign initiatives, establish scientific priorities, coordinate observations and assist in the management of resources.

Step 1. A potential campaign must be proposed electronically by at least one campaign leader, who will serve as the chief coordinator.

Step 2. The campaign proposal includes the science goals, lists the participating observatories and scientists, and provides an explicit description of the required observations and resources, and information on the availability of the data and the expected outcomes.

Step 3. The Science Working Groups work with the Observatory Reps to determine the feasibility of the proposed observations and the scientific merit. When applicable, the Scientific Institution, Professional Organization reps and/or Emerging Nations Programs give input regarding campaign participation.

Step 4. The Science Working Groups, will work to broaden the scientific impact of these campaigns by stimulating research, discussions, and activities at scientific meetings, and by identifying results which are of interest to the general public.

Campaigns will range from the use of existing data or synoptic data sets (requiring no observation planning) to intricate observing programs involving a wide variety of instrumentation. There is no limit on the time, the amount of data or the resources required for the campaigns; however, the allocation of resources will be based on the merits of the proposed campaign and the concurrence of the participating observatories

INDIVIDUAL PARTICIPATION

The IHY offers a range of opportunities for the participation of individual scientists. Individuals can

- serve as a coordinator between IHY and your scientific institution or organization to ensure overlap in scientific goals
- serve on one of the science working groups to assist in the development of innovative scientific initiatives
- help with the public outreach effort
- assist in the development of programs for developing countries
- contribute a story or "reminiscence" about IGY 1957 to the website
- propose and help coordinate an observing campaign
- serve as an observatory coordinator
- be creative - new suggestions and ideas are always welcome!

The IHY will provide an excellent opportunity for young people to get involved at all levels of the organization, from individual research to coordinating international programs.

PLANNING AND IMPLEMENTATION

Specific implementation of the goals and objectives of the IHY will be defined by the participants through a series of workshops. Several preliminary meetings have already been held, and in July of this year an IAU planning committee was formed to explore the IHY concept.

During 2004, regional workshops will be convened to begin to define the scientific programs to be accomplished within the IHY framework. In the following year international workshop(s) will be organized to coordinate the efforts among the different regions. Scientific programs will be selected which make the best use of the global reach and resources available with the IHY.

The past and near term IHY milestones are listed below. Most important is the upcoming planning meeting at Sunspot, NM.

Past Events

- October, 2002, IHY Interest Session at International Space Congress, Houston, TX
- April 2003, IHY Special Session at EGS Meeting
- July 2003, IAU IHY Planning Committee formed at the IAU Meeting in Sydney Australia.
- December 8, 2003, UK IHY Planning Workshop, London UK

Future Events

- April 20-22, 2004 First US IHY Planning Workshop, Sacramento Peak Observatory, Sunspot, NM USA.
- July 2005, First International IHY Planning Session at IUGG Meeting
- Fall 2005, IAU Colloquium in Anticipation of IHY-2007

CONCLUSION

The IHY will provide a unique opportunity to coordinate observations from the impressive fleet of current and planned international space missions, with data from solar ground based observatories ground based auroral observatories, neutron monitor observations, magnetic field observatories, ionospheric, meteorological, and other atmospheric observatories. Unprecedented, simultaneous observations with broad coverage of associated solar, heliospheric, geospace, and atmospheric phenomena will be obtained. The resulting data will allow global studies of the complete Sun-Earth system, and provide a cost-effective way to enhance scientific return from new and existing resources.