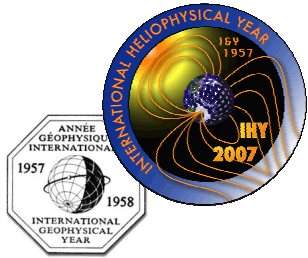


THE INTERNATIONAL HELIOPHYSICAL YEAR (IHY)

March 2007-2009

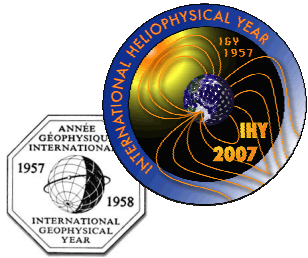
*Joseph Davila, Barbara Thompson, Nat Gopalswamy
NASA-Goddard Space Flight Center*

February 2007



IHY Objectives

- **Develop the basic science of heliophysics through cross-disciplinary studies of universal processes.**
- **Determine the response of terrestrial and planetary magnetospheres and atmospheres to external drivers.**
- **Promote research on the Sun-heliosphere system outward to the local interstellar medium - the new frontier.**
- **Foster international scientific cooperation in the study of heliophysical phenomena now and in the future.**
- **Preserve the history and legacy of the IGY on its 50th Anniversary.**
- **Communicate unique IHY results to the scientific community and the general public.**

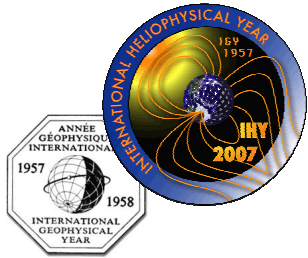


IHY Participation

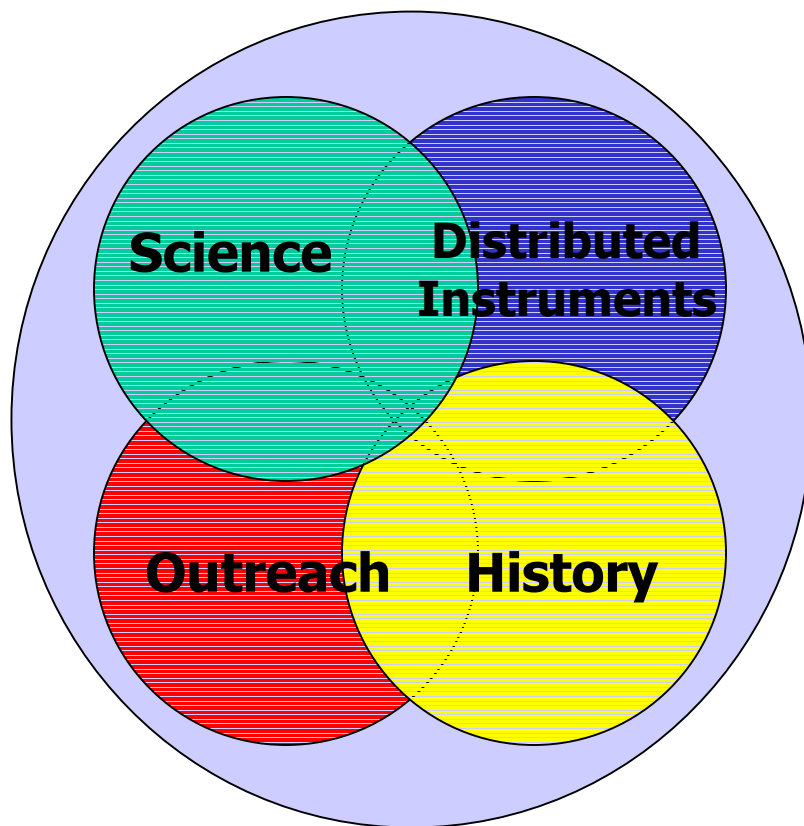
- 71 countries with National committees
- UNBSS
 - 17 *Distributed instrument observatory programs*
 - 5 *New data analysis programs for space data*
- 200 Observatories
- 65 Coordinated Investigation Plans (CIPs)
- Thousands of scientists from more than 71 countries

Don't miss this opportunity! It is not too late to participate in IHY activities. There is no cut-off. Activities will continue Feb 2007-2009.

Become active in your country now!

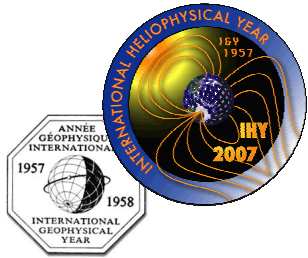


Four Elements of the IHY Program



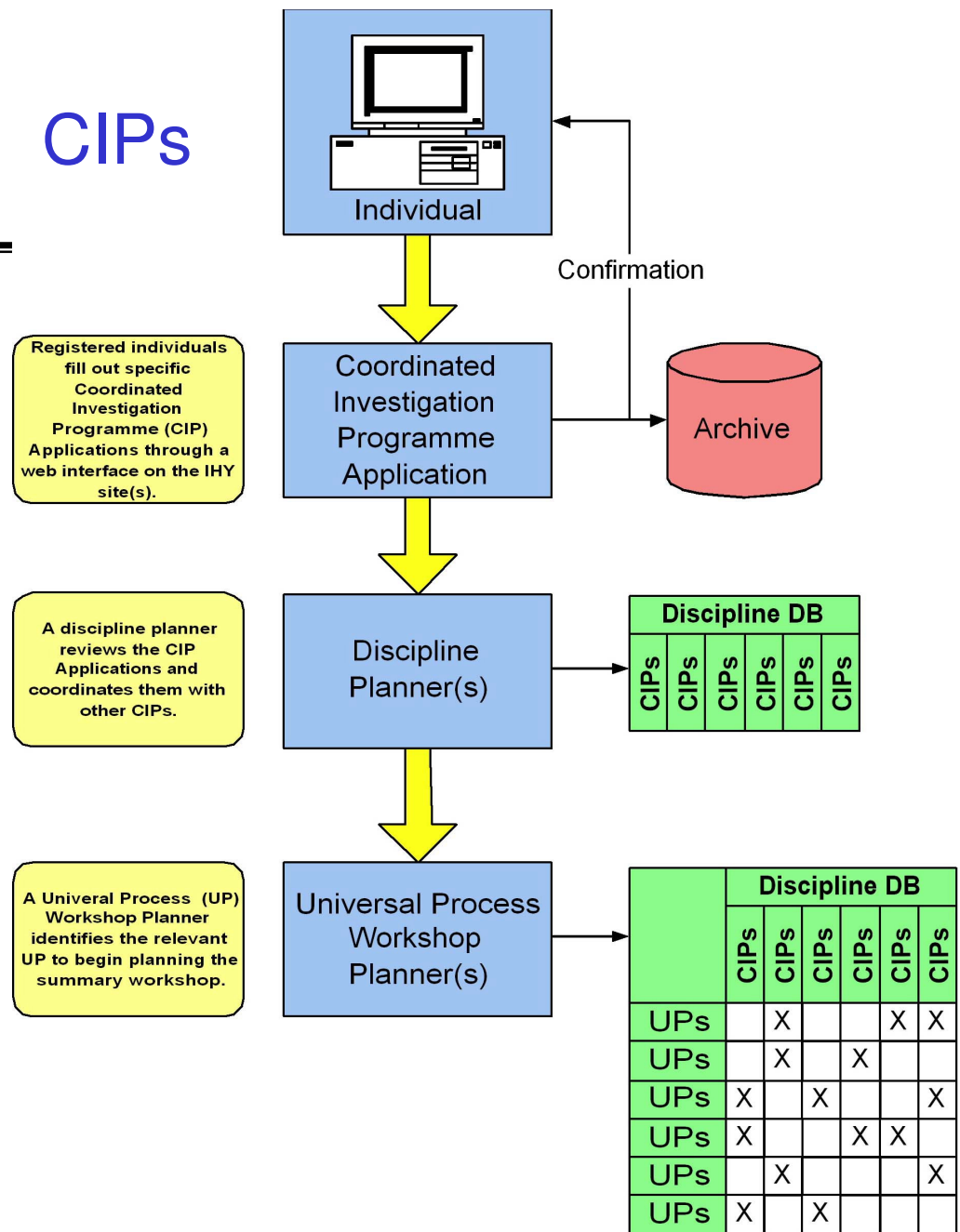
- 1. Science of Universal Processes**
 - *Coordinated Investigation Programs (CIPs) Scientific Research*
- 2. Distributed small instrument program**
 - *New observational capability*
- 3. Education, outreach**
 - *Promoting space science*
- 4. IGY History preservation**
 - *Preserving the history of space physics*

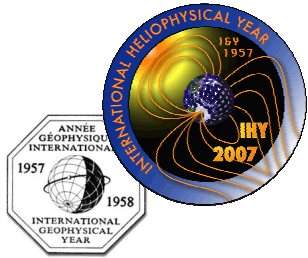
See website at <http://ihy2007.org> for more information.



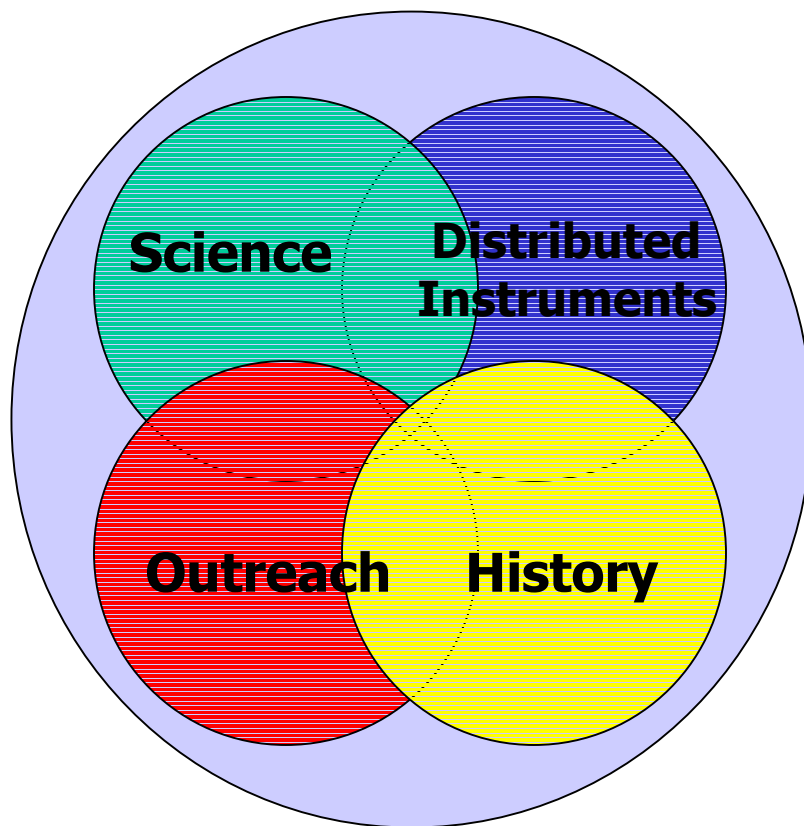
Universal Processes: CIPs

- Richard Stamper (RAL) has developed CIP website
- Regional representatives to nominate Discipline planners in following categories
 - *Solar*
 - *Heliosphere*
 - *ITM*
 - *Magnetosphere*
 - *Climate*
 - *Heliobiology*
- Currently 65 CIPs are in process



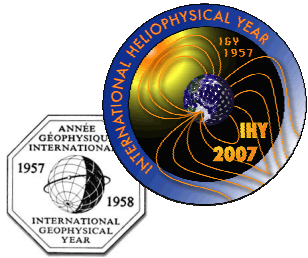


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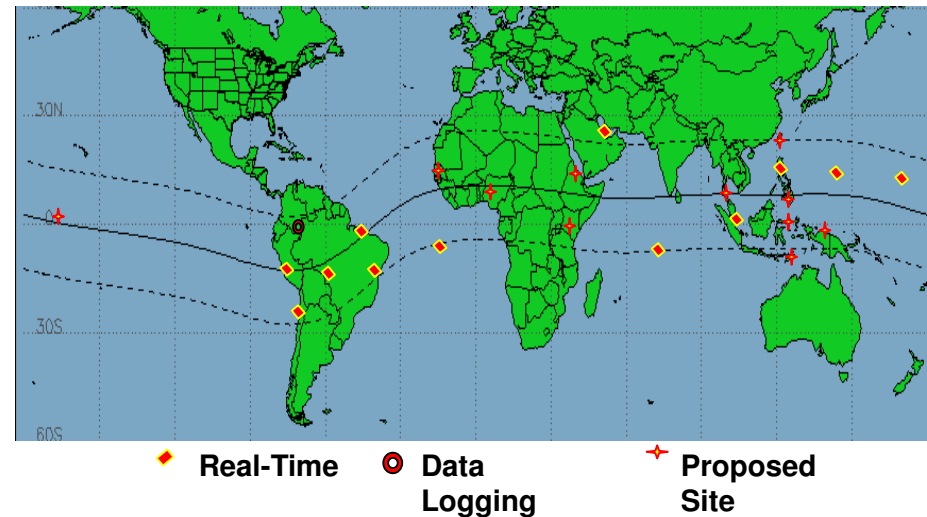
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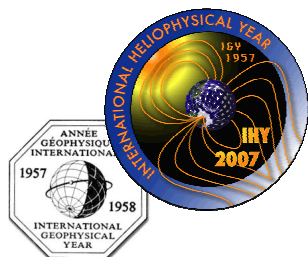
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Distributed Instruments: Basic Concept

- The lead scientist or principle investigator will provide instrumentation (or fabrication plans)
- The host country provides the workforce, facilities, and operational support typically at a local university.
- Host scientists become part of science team
- All data, and data analysis activity is shared
- All participate in publications and meetings
- UN-BSS dedicated to the program at least thru 2009





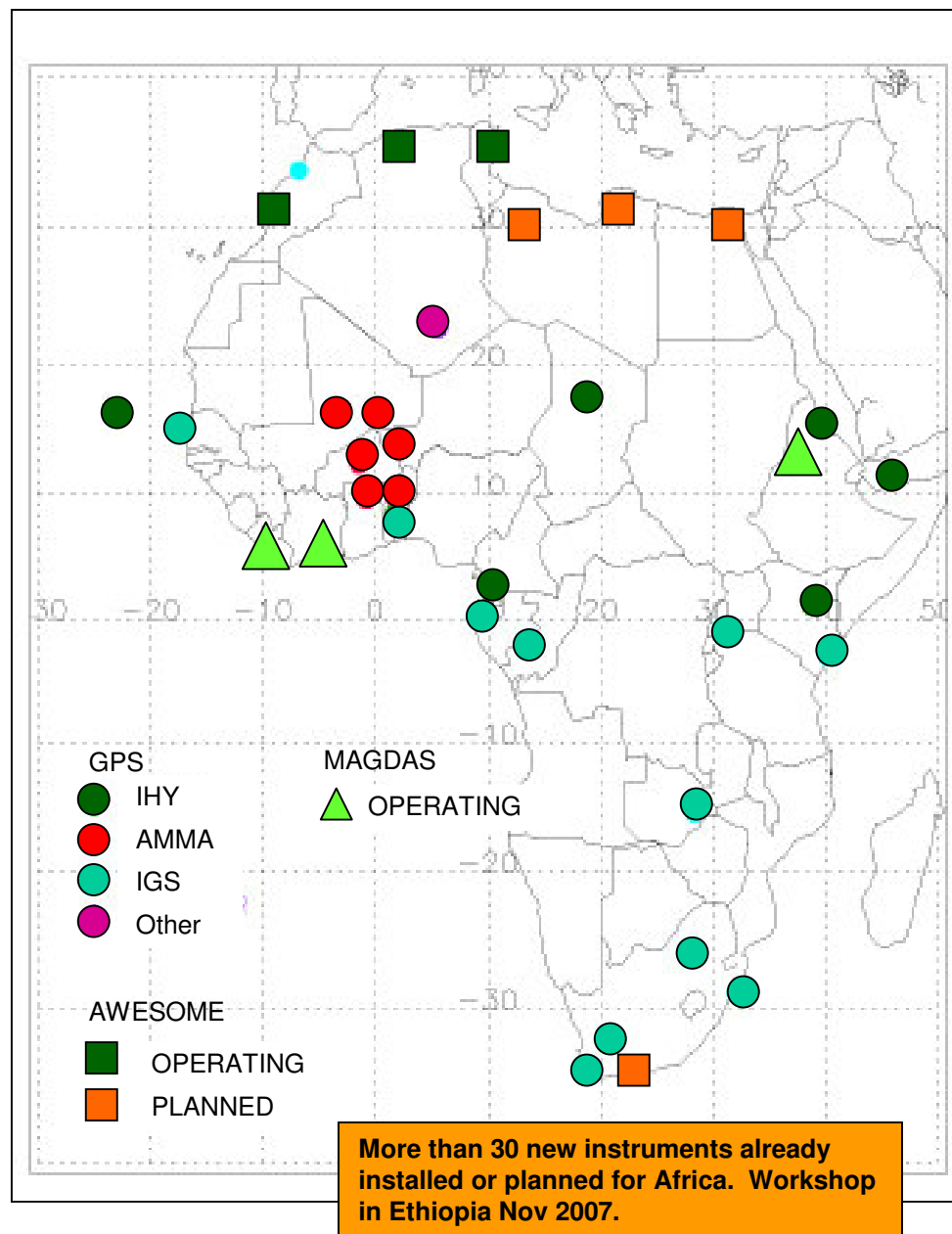
UN-NASA Workshop Series

- **First Workshop**
 - *UN, ESA, NASA, and UAE Government sponsored*
 - *Approximately 120 participants from 27 countries*
- **Second Workshop**
 - *UN, NASA and Indian Government sponsored*
 - *Approximately 120 participants from 30 countries*



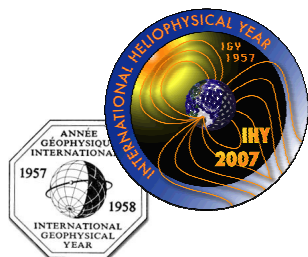
These Workshops have been highly successful at establishing new collaborations between instrument providers and hosts





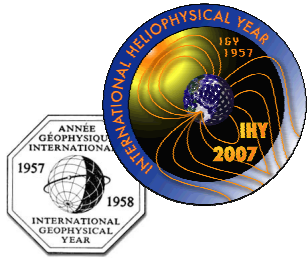
IHY (<http://ihy2007.org>)

- **AWESOME** space weather monitor in Tunisia Oct 2005. Instruments were installed in Algeria and Morocco in summer 2006, upcoming sites will be in Libya, Egypt and South Africa, with the goal of widespread instrumentation activities taking place in 2007-2008.
- IHY-Japan has made significant progress towards the completion of its 51-magnetometer MAGDAS global network with a new installation site on MacQuarie Island, Ethiopia, Ivory Coast, Nigeria, and Malaysia.
- The **RENOIR** ionospheric observing station program has received support for development, and will be making plans for instrument host sites later this year.
- The deployment Latin-American **SAVNET** VLF receiver chain will begin in 2006 with the target of being operational in 2007.
- The **SCINDA** scintillation network will double the size of their equatorial network, instrumenter's meeting July 2006 in Cape Verde in preparation for new deployments.
- Radio spectrometer network deployment in Japan, India, US, Switzerland, Mexico (in progress). First light in India last week!
- Armenian particle detector will be deployed in Bulgaria.



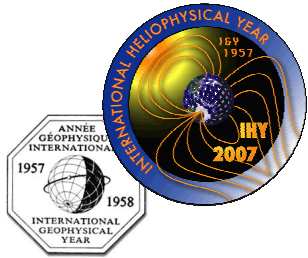
Instruments

| | INSTRUMENT | CONTACT | STATUS |
|----|---------------------------|--|---|
| 1 | CALLISTO | C. Monstein (Switzerland) | Deployed in India, others in progress |
| 2 | H-alpha Telescope | K. Shibata, S. Ueno (Japan) | First observatory operating in Chile |
| 3 | MAGDAS Magnetometers | K. Yumoto (Japan) | Deployed in Malaysia, Ethiopia, Nigeria, Ivory Coast |
| 4 | GPS Scintillations | C. Amory-Mazaudier (France), and T. Rowell (USA) | More than 25 new installations across Africa (see map) |
| 5 | SCINDA GPS | K. Groves (USA) | Deployed in Cape Verde, Nigeria, others in progress |
| 6 | CIDR | T. Garner (USA) | 4-instrument chain planned for Egypt |
| 7 | VLF Radio | U. Inan (USA) | Installed in Morocco, Algeria, Tunisia |
| 8 | RENOIR | J. Makela (USA) | Instrument funding obtained, instrument development in progress |
| 9 | SEVAN Particle Detectors | A. Chillingarian (Armenia) | Instrument for Bulgaria being fabricated |
| 10 | AMBER-AGREES | E. Yizengaw (USA) | In progress |
| 11 | SAVNET | J.-P. Raulin (Brazil) | Instrument funding obtained |
| 12 | Low-cost Ionosonde | J. Bradford (UK) | Seeking instrument funding |
| 13 | IHY Mag | I. Mann (Canada) | Seeking instrument funding |
| 14 | Low-frequency Radio Array | J. Kasper (USA) | In progress |
| 15 | Muon Network | K. Munakata (Japan) | In progress |



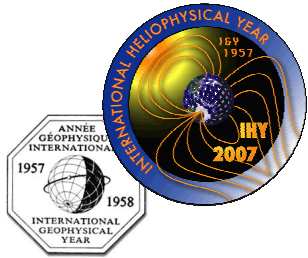
Instruments (Cont)

| | INSTRUMENT | CONTACT | STATUS |
|----|------------|--------------------------|---|
| 16 | Liulin | T. Dachev (Bulgaria) | Instruments available, seeking sites for deployment |
| 17 | SAMA | J. H. Fernandez (Brazil) | Seeking funding for instruments |

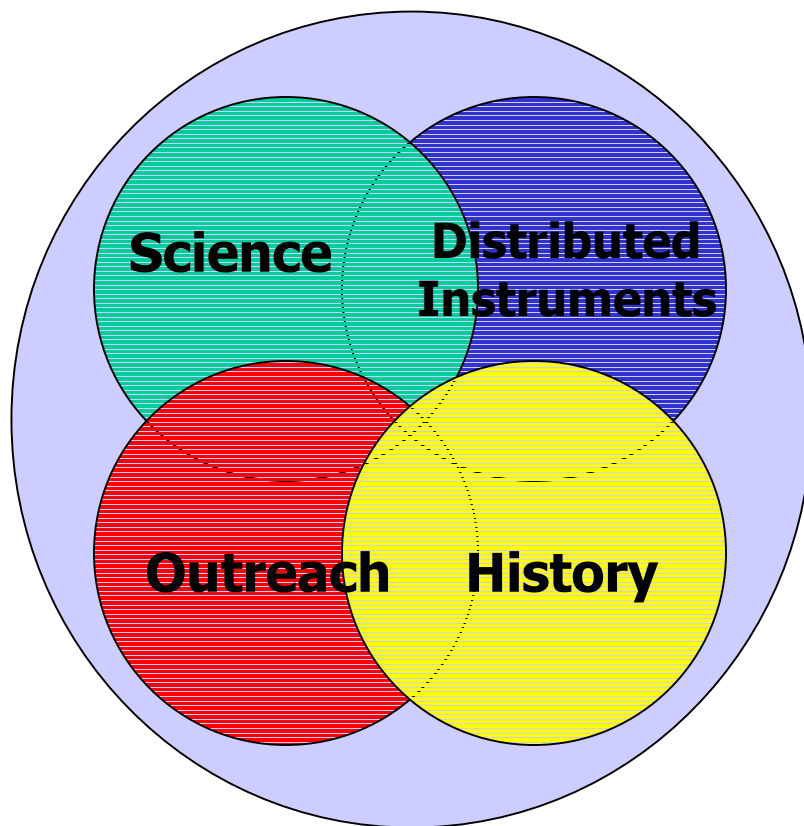


Extending the IHY-UNBSS Concept to Space Data

- **Space data exists in data bases that can be reached via internet**
- **Some data analysis projects require work of a team**
 - *Solar cycle effects, large-scale correlations*
- **Concept**
 - *Science lead defines project*
 - *Team works on the project (through CIP) and shares in all scientific results and publications*
- **Initial Projects**
 - *Development of Gnu Data Language (GDL) – free scientific software package to analyze space data*
 - *Low-cost IDL licenses from RSI*
 - *SOHO-SUMER data set*
 - *SAMPEX data set*
 - *CME catalog analysis*

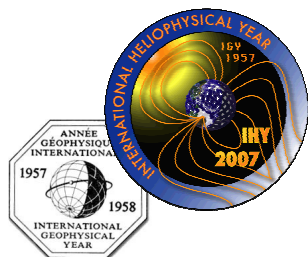


Four Elements of the IHY Program



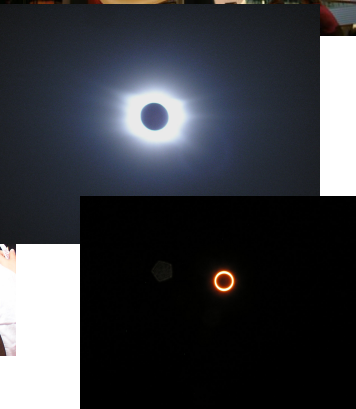
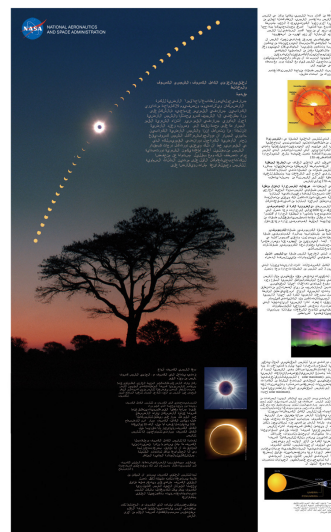
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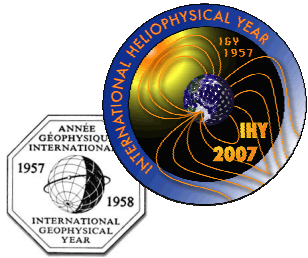
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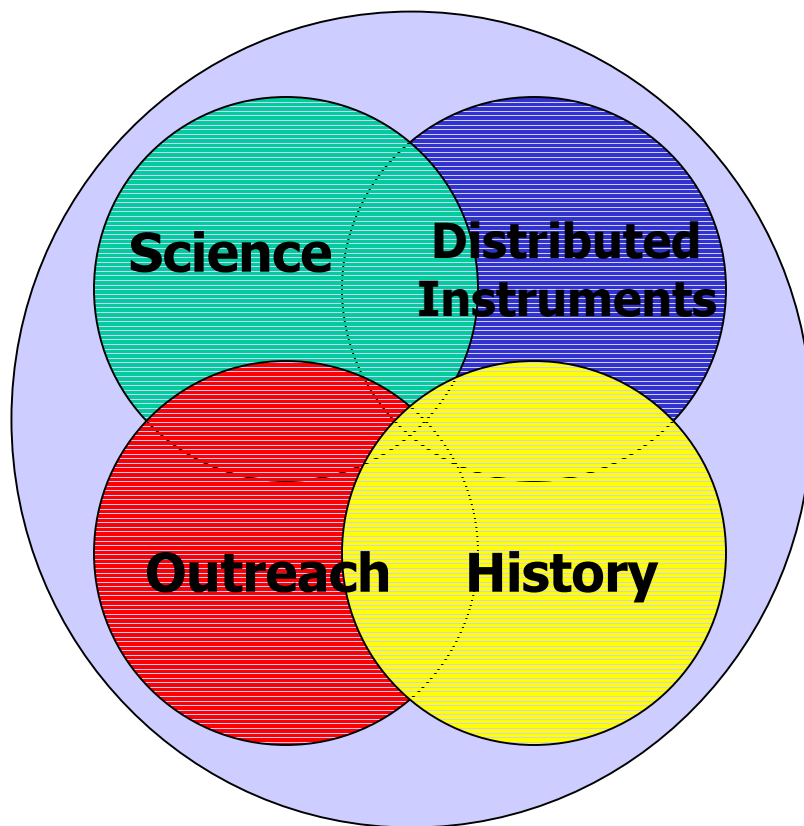
IHY Outreach

- Professional development
- Strengthening space science research in universities
- Education
- **Activities**
 - *Yuri's night*
 - *Coordinated Sputnik-Explorer Symposia*
 - *Summer schools in US, Europe, Asia, South America*
 - *World-wide observatory open house June 10, 2007*
 - *Science outreach to youth*



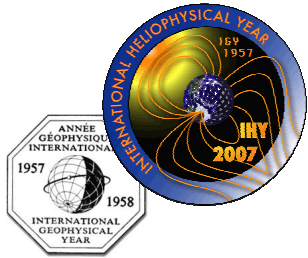


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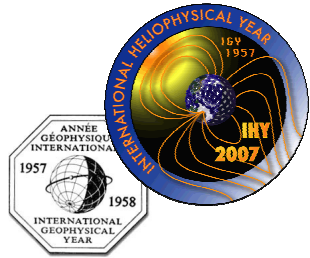
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History Preservation: IGY Gold Program

- **Sponsored by IUGG**
- **Managed by IHY for all International Years**
 - *Certificates available in IHY, IPY, eGY, and Planet Earth formats*
- **Recipient must**
 - *Have participated in the IGY in some capacity*
 - *Provide an artifact of historical interest*
 - *Agree to have name made public on website*
- **Artifacts will be cataloged and held temporarily at the GSFC library**
- **History sessions organized for several meetings, NRA for funds available in the US**





Kickoff Plans

Feb 14-23, 2007

- **Poster displays from NASA, IHY Secretariat, and other countries in the rotunda of UN-Vienna.**

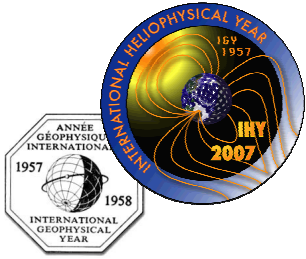
Feb 19, 2007

- **Presentation to the Science and Technology Subcommittee (STSC) by Secretariat and interested parties**
- **Ceremony in the rotunda of UN-Vienna during the meeting with all regional coordinators present, and as many of the Steering Committee, the Advisory Committee members, and National Representatives present as possible.**
- **US Dept of State will sponsor a reception in the evening on the day of the ceremony.**

Feb 20, 2007

- **A 1-day Workshop to discuss final plans at Academy of Science in Vienna**

Summary



“... science is the most powerful means we have for the unification of knowledge, and a main obligation of its future must be to deal with problems which cut across boundaries, whether boundaries between the sciences, boundaries between nations, or boundaries between man’s scientific and his humane concern.”

-- John F. Kennedy

*In: A Century of Scientific Conquest by John F. Kennedy, in The Scientific Endeavor,
Centennial Celebration of the U.S. National Academy of Sciences, 1963.*