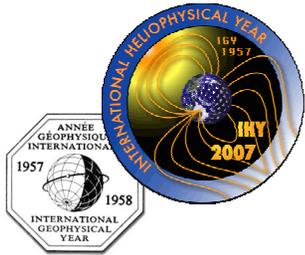


PLANS FOR THE INTERNATIONAL HELIOPHYSICAL YEAR (IHY)

An international program of scientific research

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

June, 2005



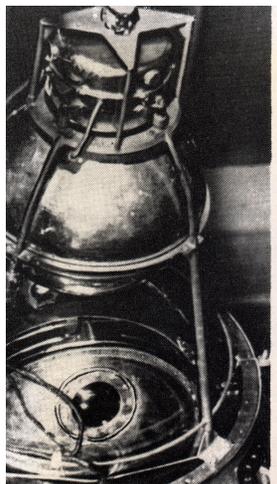
Why IHY? Historical Perspective

- **First International Polar Year**

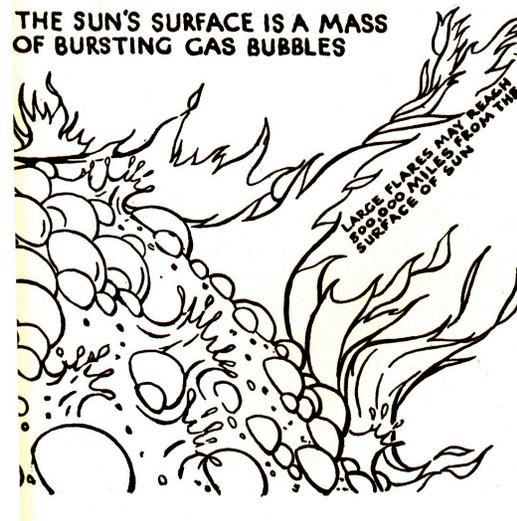
- January 1875 at the Academy of Sciences in Vienna Carl Weyprecht suggested a coordinated study of the north polar region
- Polar meteorological and magnetic observations commenced on Aug 1, 1882 and concluded Sep 1, 1883

- **Second International Polar Year**

- Scientific activities were significantly limited by the world-wide economic depression
- Polar meteorological and magnetic observations to be made in 1932-1933, fifty years after the first IPY

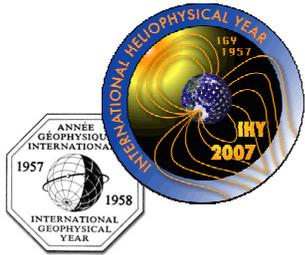


SOVIET EMBASSY

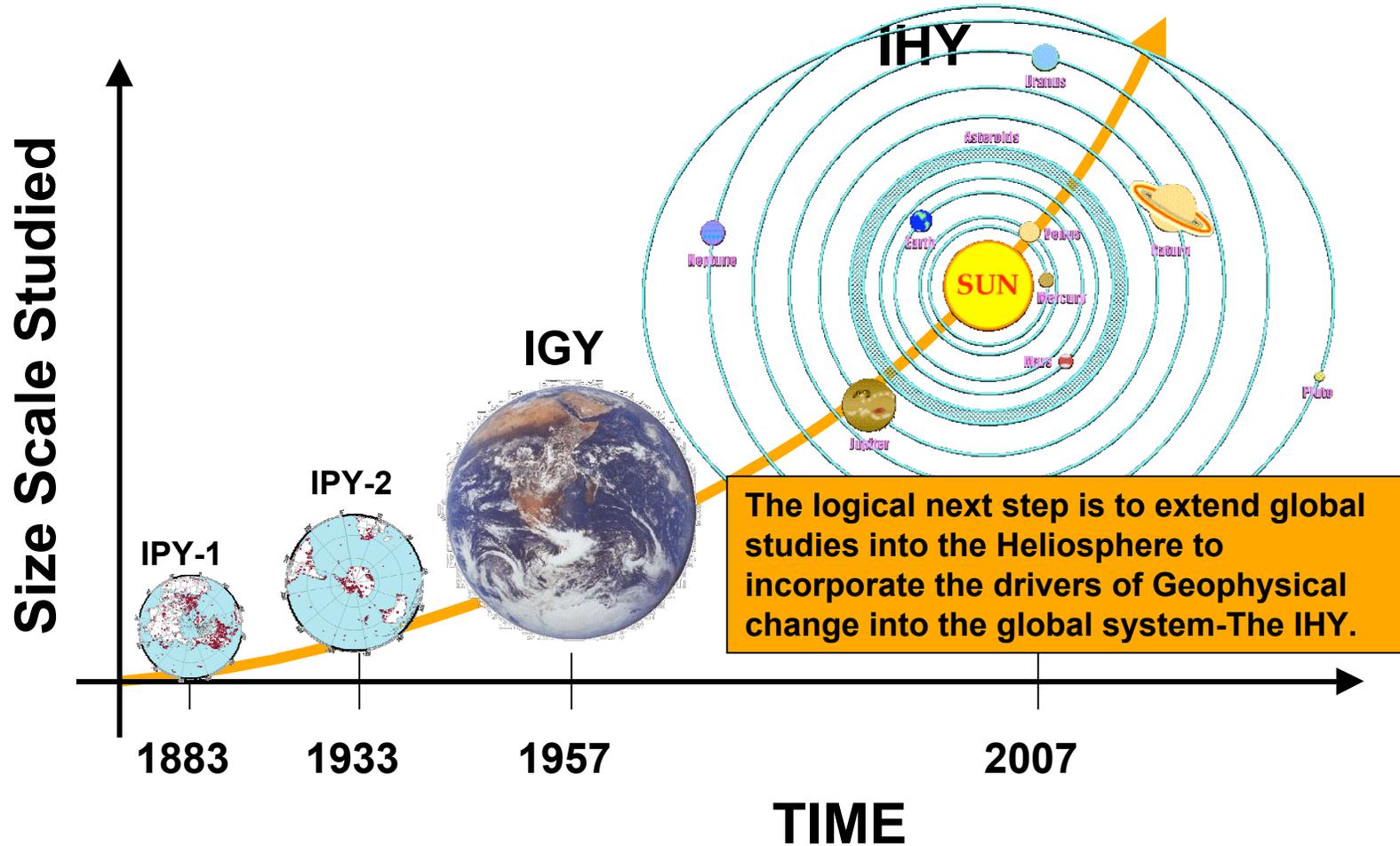


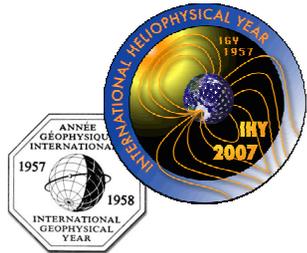
- **International Geophysical Year**

- In 1957 the IGY involved about 60,000 scientists from 66 nations
- To obtain simultaneous, global observations on Earth and in space

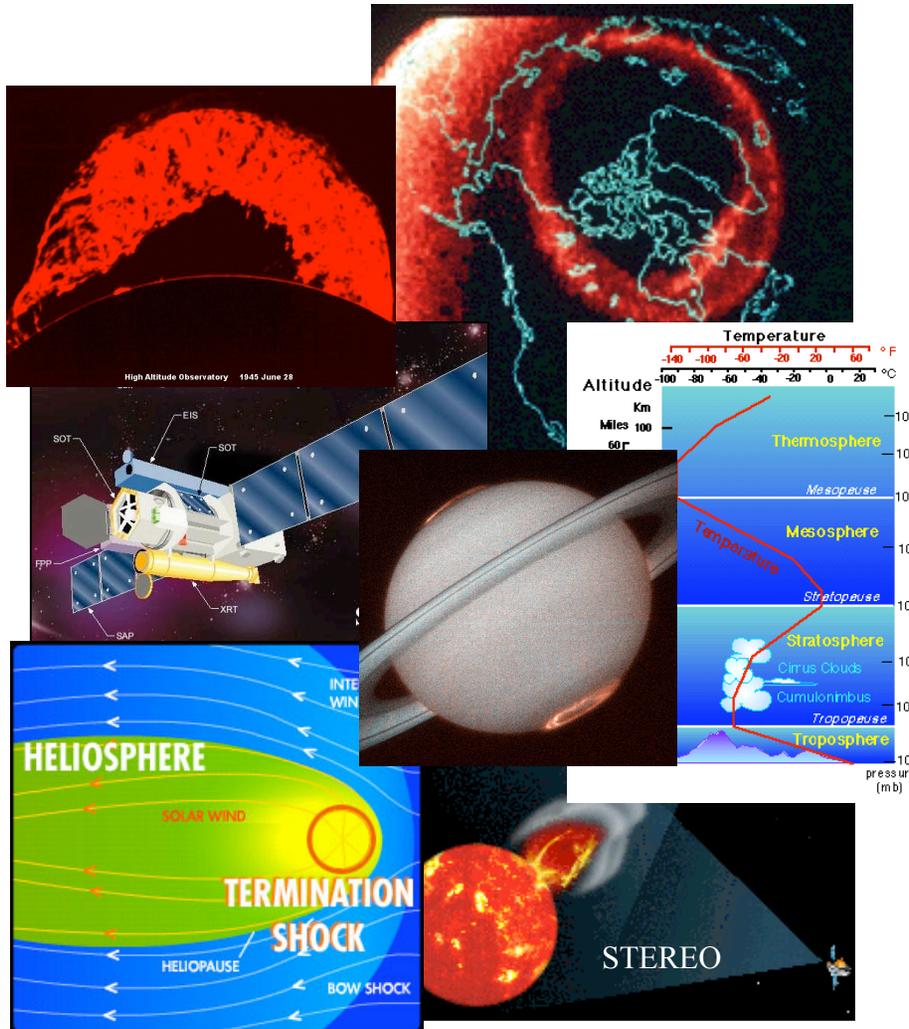


Evolution of System Studies



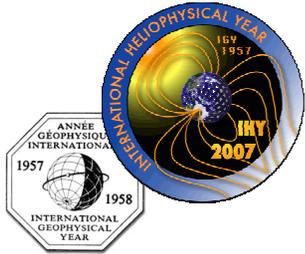


Why Now?



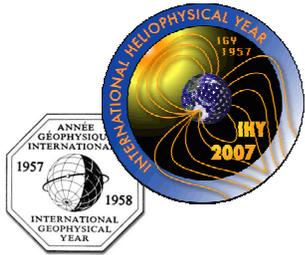
- **Distributed Great Observatory** - A large armada of existing or planned spacecraft are in place to provide the most comprehensive global measurements of the sun-earth-interplanetary system yet obtained
- **Earth based observatories** – Provide measurements of terrestrial effects at the poles and elsewhere
- **Electronic Era** - Easier today than in previous international years with abundant and cheap electronic communication available

NOW is the best opportunity to study the global heliosphere in next 50 years

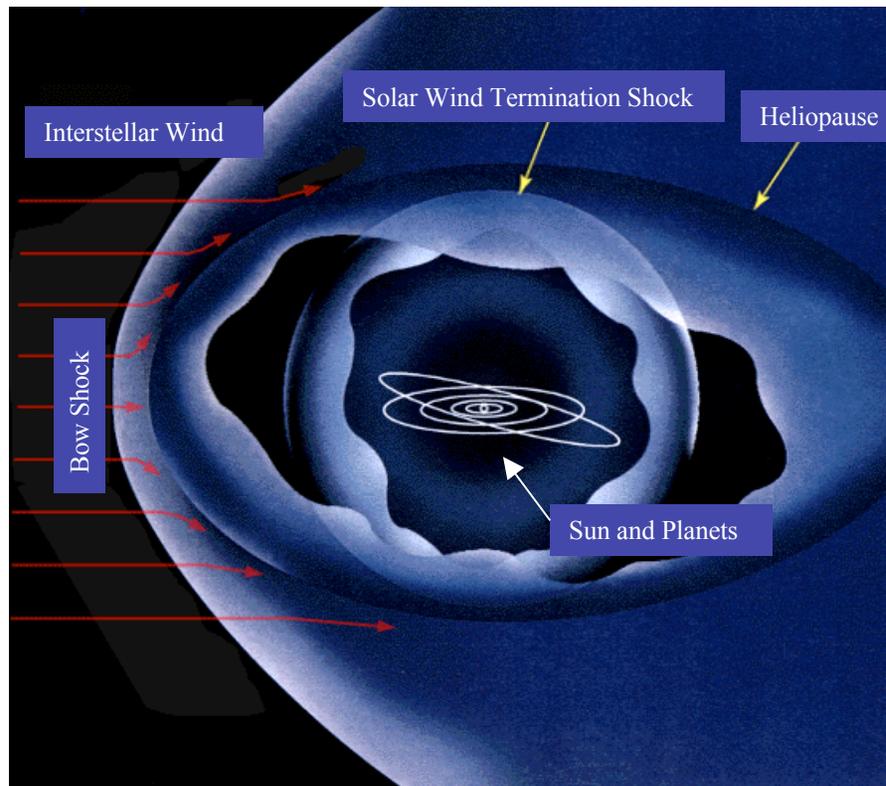


IHY Overview

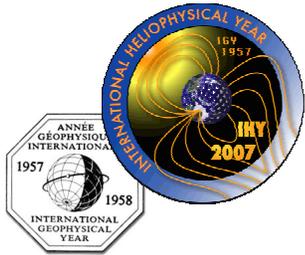
International	Heliophysical	Year
<ul style="list-style-type: none"> • Share costs and resources • Coordinated use of facilities many of which are unique • Fosters cooperation in space physics • Most science for dollar invested • Maximum public outreach 	<ul style="list-style-type: none"> • Cross-cutting solar system research • Global studies of large scale processes • Requires broad range of scientific disciplines • “Heliophysics” 	<ul style="list-style-type: none"> • IGY and Space Age 50th Anniversary, and ISTEP 10th <ul style="list-style-type: none"> • Maximizes public interest • Provides global scientific focus • Solar Minimum <ul style="list-style-type: none"> • Sun in simplest state • Events well separated • Large number of space and ground observatories operating • Focused science program • Establish baselines
<h2>UNIVERSAL PROCESSES</h2>		
<p>Objectives</p> <ol style="list-style-type: none"> 1. Causal relationship between external processes and planetary magnetospheres, ionospheres, and atmospheres 2. Sun-heliosphere system outward to the heliopause -- The new frontier 3. Foster international scientific cooperation in the study of Heliophysical phenomena 4. Communicate the unique scientific results to the general public 		



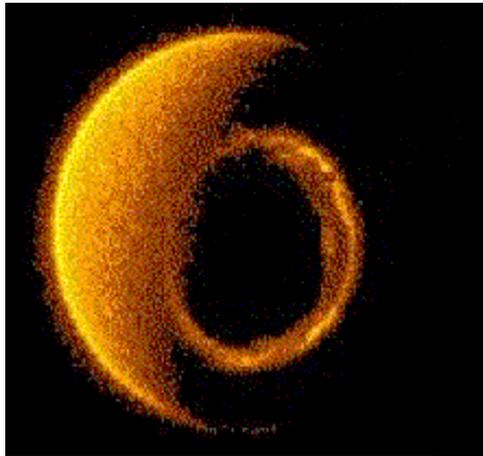
IHY Scientific Goals



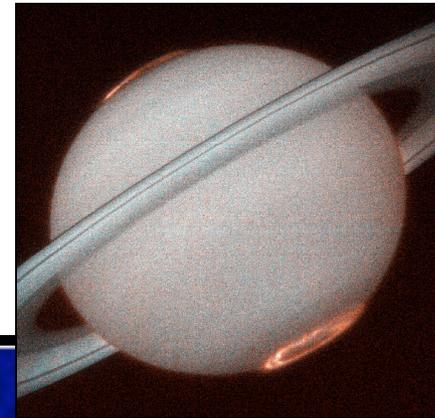
1. Understand the relationship between external processes and planetary environments (magnetospheres, ionospheres, and atmospheres)
2. Understand the Sun-heliosphere system outward to the heliopause -- The new frontier
3. Foster international scientific cooperation in the study of Heliophysical phenomena now and in the future
4. Communicate the unique scientific results of the IHY to the scientific community and to the general public



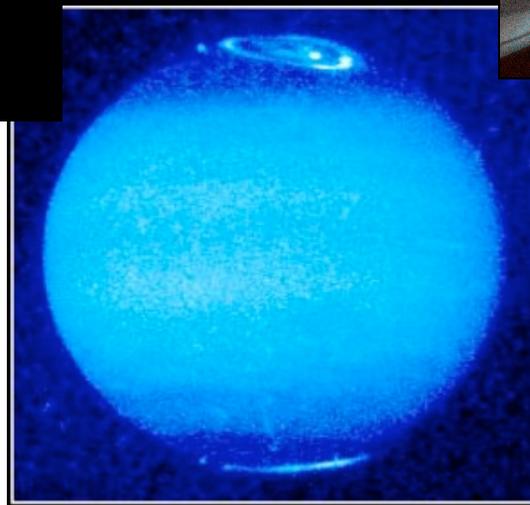
Universal Processes



Earth's aurora

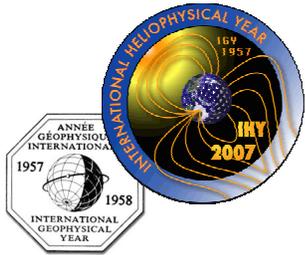


Aurora at Saturn's poles



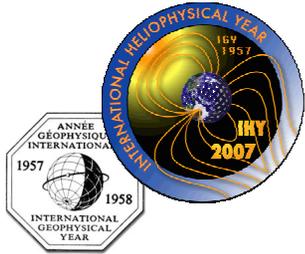
Jupiter's aurora imaged with HST

- **Similar physical processes are evident in vastly different environments**



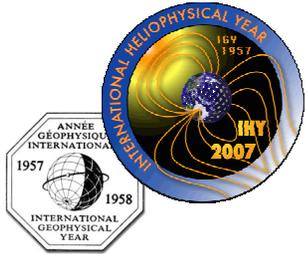
Elements of IHY Plan

- Coordinated Investigation Programs (CIPs)
- Distributed small instrument program
- Education, outreach and IGY History preservation



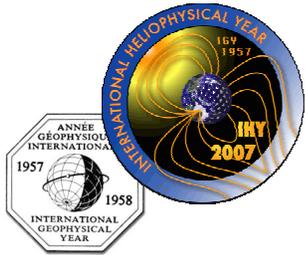
Coordinated Investigation Programs (CIPs)

- **Basic unit of scientific research within IHY**
 - *Will combine observation and modeling to address an observational objective*
- **Originated by researcher using web form**
 - *Now available!!*
- **Many examples identified in planning workshops**
 - *Comparative Planetary Aeronomy*
 - *Whole Heliosphere Intervals*
 - *Reconnection, Shock acceleration, ... etc*
- **CIPs organized into Universal Processes by coordinators**
- **Cross-cutting scientific data analysis workshops organized by Universal Process**



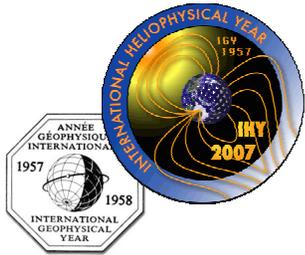
Distributed Instruments

- **Objective is to help facilitate the deployment of distributed instrument arrays**
 - *Extension of existing arrays, or new arrays*
 - *Provides meaningful participation for developing nations*
- **Instrument providers are united with university groups from potential host nations**
 - *Potential Instruments, GPS, radio dishes, magnetometers, all-sky cameras, additional neutron monitors, etc.*
- **Implemented jointly with United Nations Basic Space Science Program**
 - *UNBSS program devoted to this effort through 2009*
 - *Three-year work plan approved by COPUOS and Gen Assy*
- **First Workshop in UAE November 2005**
 - *Instrument concepts selected by Aug 2005, contact Nat Gopalswamy (gopals@fugee.gsfc.nasa.gov) to be considered*
 - *Other participants selected by Sep 2005*



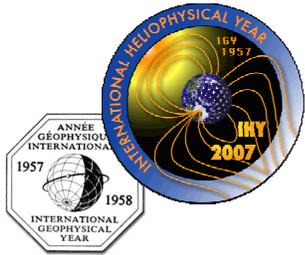
Education and History

- **Education**
 - Website <http://ihy2007.org> with large amount of material (currently being reorganized)
 - Joint program with US State Dept for scientific outreach in North Africa in conjunction with solar eclipses 2005, 2006
 - Summer schools – plans in progress ...
- **Preservation of IGY history**
 - Active history group formed
 - IGY Gold Certificates to recognize the contribution of IGY participants (joint with eGY, IPY)
 - Open to all participants in IGY
 - Recipients provide historical material from IGY
 - Nomination and criteria available at IHY website
 - Funded by IUGG



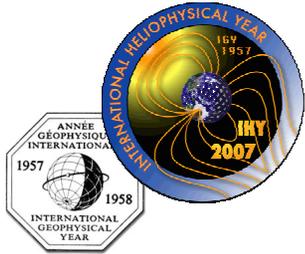
Other Support for the IHY

- **Workshop and website support fully funded for FY-2004 and FY2005 in US**
 - *Two community workshops held April 2004, and Feb 2005*
 - *Information website developed*
 - *Campaign website ready*
- **IHY Secretariat provided by AGU**
- **IAU provides support for developing international organization**
- **Other Endorsements by COSPAR, NAS-CSSP, NCAR, SECAS, SHINE, AOGS, SCOSTEP, ...**



IHY Overall Schedule

- **2004:** Regional coordination meetings, campaigns begin to be defined, synergy/coordination discussions with professional organizations
- **2005:** Synthesis from regional to international, merging of science working groups and campaigns, identifying missing initiatives
- **2006:** Prototyping year, preliminary work, review and finalize campaign proposals, proposals to national funding agencies
- **2007:** IHY campaigns
- **2008-9:** CDAWs, publications, archives



Near Term Events Calendar

- **Roll-out of IHY CIP Planning Website**
 - *Now available along with reorganized website*
- **1st International Planning Meeting**
 - *International Association of Geomagnetism and Aeronomy, Toulouse, France, July -23, 2005*
- **IHY-UNBSS Planning Workshop**
 - *United Arab Emirates, November 2005*
 - *Contact Nat Gopalswamy (gopals@fugee.gsfc.nasa.gov)*