

# MISSION STATUS

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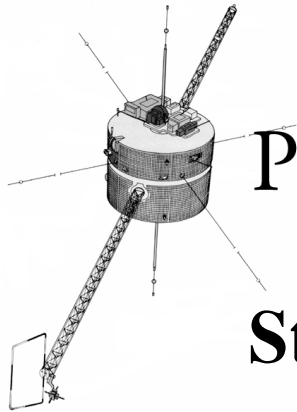
MISSIONS: POLAR, WIND, GEOTAIL, CLUSTER

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SECAS Dec 01

# New Phase of Geospace Investigations

- The Geospace Missions are:
  - Polar, Geotail, Cluster, IMAGE, SOHO, ACE, Wind, FAST, SAMPEX
- They will operate “to provide new opportunities for scientific discovery in Geospace science.”
- Collaborations will be accomplished via:
  - Campaigns - defined from both past and future data acquisitions
  - Workshops - augmentations at 2002 project meetings; fall joint workshop
  - Special AGU sessions - two at spring AGU
  - Web design - new home page and links
  - E/PO activities - e.g., Polar/IMAGE conjugate aurora press conference at Fall AGU
  - Small amount of pooled funding for collaborations



# POLAR

CAMMICE, CEPPAD, EFI, HYDRA, MFE, PIXIE,  
PWI, SEPS, TIDE, TIMAS, UVI, VIS

## Status of the Spacecraft and Ground Operations

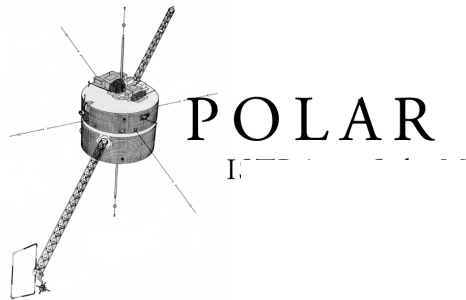
- The Polar spacecraft and instruments are healthy. Only the plasma wave instrument has suffered a major fault; it now operates only during eclipse.
- Polar has accepted responsibility for reducing the size and scope of ground operations for Polar, Wind and Geotail based on HQ directives. Three architecture studies are expected to be completed by December 15.
- In March of 2002, Polar will initiate semi-annual attitude maneuvers to extend orbit normal operations for auroral imaging and optimize fuel usage.

Spring 2002 – half flip to ecliptic normal

Fall 2002 – half flip to orbit normal

Spring 2003 – full flip to orbit normal

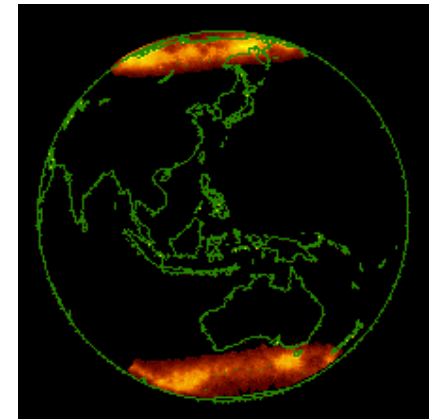
Fall 2003 – half flip to ecliptic normal (permanent)



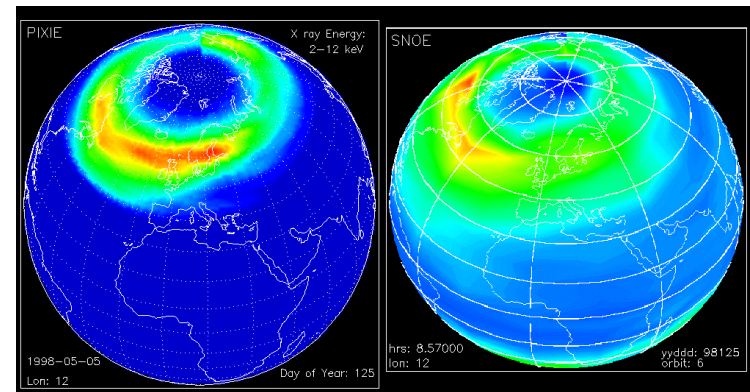
# Science Status

- Polar's auroral science has progressed to studies of conjugate aurora and to investigations of the magnetospheric drivers of upper atmospheric chemistry changes.
- Polar has completed a prolonged observation campaign across the dayside equatorial magnetopause (low-latitude boundary layer, turbulent boundary layer, magnetosphere, and magnetosheath) with high-temporal and spatial resolution and is now completing a similar campaign through the nightside equatorial region near 9 R<sub>E</sub>.
- A special section in the September JGR-Blue featured 21 papers of new Polar accomplishments in particle acceleration, reconnection, substorm onset, ion outflow, auroral power and precipitation, and energetic particles of the radiation belts.
- A special section on the "Causes of the Aurora" has been approved for 2002.

10/22/01



Four conjugate events were captured in October



Precipitating electrons Nitric oxide abundance

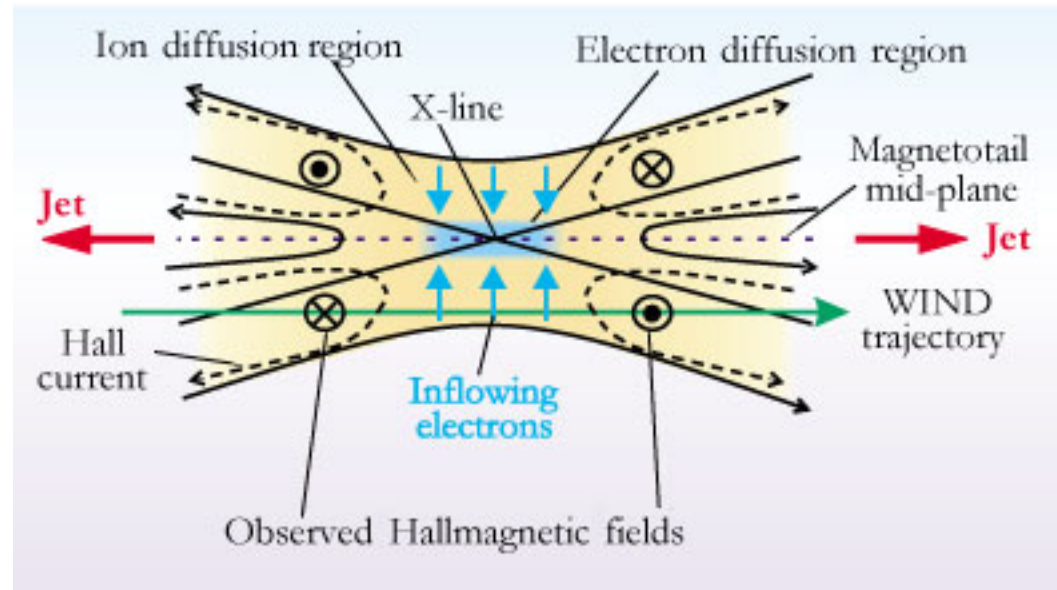
# WIND



- WIND is now in a distant prograde orbit (DPO) which carries the spacecraft 323 Re forward of and behind the Earth in its orbit.
- As a result of the senior review directives, plans are underway to move WIND to L1. WIND Team studies indicate that a Lissajous orbit is the best option for fuel conservation.
- While moving to and occupying the L1 location, WIND will operate continuously although at reduced funding. Along with other operating spacecraft WIND will conduct a number of magnetospheric and heliospheric campaigns.
- New WIND Mission Science Statement:*

*The purpose of the new WIND mission is to be available to replace the ACE spacecraft when and if this becomes necessary, to operate coordinated science campaigns with other spacecraft, and to make available solar wind plasma, magnetic field, energetic particle, plasma wave, and gamma-ray burst measurements on a basis consistent with available resources.*

# WIND Reconnection Observation



The WIND spacecraft passed through a reconnection event on April 1, 1999. Its trajectory, shown in green, took it through the Hall-like system of magnetic fields and electric currents established by inflowing electrons during reconnection. (Figure adapted from Oieroset et al., *Nature*, **412**, 414, 2001.)

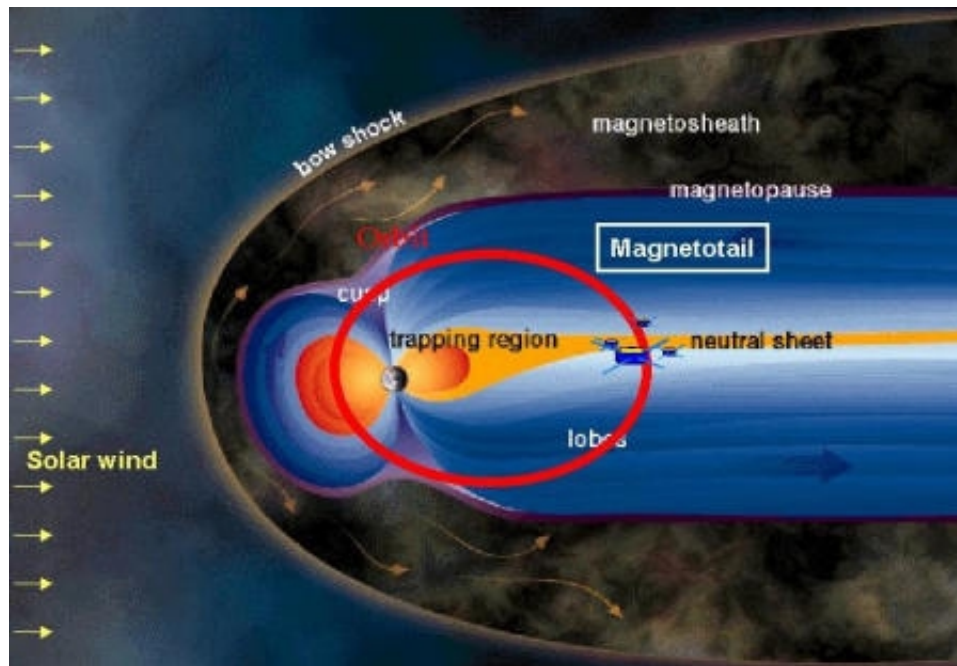
# GEOTAIL

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- During its tenth year of operation, Geotail and its various instruments continue to perform very well.
- In its unique 9 X 30 Re equatorial orbit Geotail continually makes traversals through many of the most interesting regions of the bow shock/magnetosphere system. Geotail spends roughly half its time in the solar wind; with the termination of IMP 8, Geotail remains as the sole provider of near-Earth solar wind and IMF data.
- Over 40 Geotail papers have appeared in the first 11 months of 2001, with about three quarters of the first authors not associated with Geotail instrument teams. This fact illustrates the value of Geotail to the space science community. About 60% of these papers involve the magnetotail, advancing our understanding of magnetotail processes such as substorms and magnetic reconnection.

# CLUSTER



Cluster's  $4 \times 19 R_E$  orbit is now completely within the magnetosphere. With apogee currently on the night side of the Earth, the orbit carries the quartet into the geotail in the premidnight region and through the dayside plasma entry region in the prenoon sector.

New results have included detailed studies of the motion of the magnetospheric bow shock and polar cusp in response to varying solar wind conditions, and investigations of the sources of the various kinds of waves observed in the magnetosphere -- in particular, the discovery of the source location and characteristics of waves responsible for precipitating some auroral particles.