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INTERNATIONAL SOLAR TERRESTRIAL PHYSICS (ISTP) GEOTAIL MISSION

JJ574450

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L/V Range: Delta II 7925/ETR

Launch Date: July 1992

Projected SC Life/DSN Support: 24 months Prime (1-year ext.)/3 years

Project Responsibility: JPL Lead Network (ISAS Cooperative)

Source: SIRD (GSFC)
Sponsor: ISAS-OSO

A. GENERAL

The Geotail spacecraft will be provided by ISAS and will be a spin-stabilized cylindrical spacecraft 2.2 m in diameter and 2.3 m in height with a despun antenna. NASA will provide a Delta Launch Vehicle, tracking support by the Deep Space Network (DSN), and data processing support by the Goddard Space Flight Center (GSFC). In exchange, ISAS will reserve part of the payload for NASA instruments together with a certain number of investigators from the United States.

As the solar wind flows toward the Earth, some of the energy is modified by the Earth's magnetosphere, ionosphere, and upper atmosphere. This interaction causes the flow to be altered, creating a plasmasphere, plasma sheet, and ring currents in the Earth's Geomagnetic tail region. The result is a series of distinct regions which affect processes on the Earth. By traversing the tail region to a variety of depths, Geotail will be able to determine the

size, position, and other properties of these regions. When correlated with information obtained from the other ISTP spacecraft, Geotail data should help to provide a more complete understanding of how the solar processes affect the Earth's environment.

B. FLIGHT PROFILE

The first launch of the COSTR Initiative will be the ISAS spacecraft Geotail. Presently, Geotail's launch will be in July 1992. The primary mission will have a duration of 24 months and an extended mission phase, lasting 1 year, can be expected. Two orbital phases are planned for Geotail.

In Phase 1, the Moon's gravity is used to control apogee, perigee, and orbital position in the magnetosphere by means of double lunar swingbys. Apogees will range from approximately 80 to 250 Re while perigees will vary between 5 and 10 Re. The orbital period during this phase will be 1-, 2-, and 3-month orbits, starting with the first lunar swingby in September 1992.

In Phase 2 Geotail will be moved to a lower geocentric orbit having dimensions of 8 x 30 Re. The orbital period during this phase will be approximately 4.9 days, starting in May 1994.

Orbits in both Phase 1 and Phase 2 will lie in or near the Moon's orbit plane.

C. COVERAGE

Primary ground station support will be from the USUDA 64-m station for 8 hours/day, 5 days/week. (S- and X-band).

DSN support will consist of receiving between three and four tape recorder data transfers per day, over two or three DSN stations. Each transfer of data takes 2 hours at 65 kb/s or 1 hour at 131 kb/s (S-band only). The bit rate will depend on the spacecraft range and whether support is from a 26- or 34-m station.

The 26-m stations are baselined for Geotail support. However, portions of the mission will be supported by the 34-m STD stations.

The support provided by the DSN is indicated in the following table:

<u>System</u>	<u>Goldstone</u>		<u>Canberra</u>		<u>Madrid</u>	
	12, 14, 15, 16		42, 43, 45, 46		61, 63, 66	
S-band TLM	B	P	B	P	B	P
S-band TRK	B	P	B	P	B	P

D. FREQUENCY ASSIGNMENTS

Frequencies are allocated according to the following table:

<u>System</u>	<u>Uplink (MHz)</u>	<u>Downlink (MHz)</u>
S-band	2081.0	2259.91
X-band	----	8474.66 (contingency Telemetry support by DSN)

E. SUPPORT PARAMETERS

(1) Telemetry

Real time contingency 65.5 kb/s or 16.4 kb/s or	PCM(NRZ-S) Conv, BiOL, PM
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Playback 131 kb/s or 65.5 kb/s	PCM(NRZ-S) Conv, BiOL, PM
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(2) Command	Not Required
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(3) Ranging (Not simultaneously with Telemetry)	DSN Standard
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F. TRACKING SUPPORT RESPONSIBILITY

The allocation of responsibilities for tracking support is listed in the following table:

<u>Mission Phase</u>	<u>Support Responsibility</u>
Launch - L+2 weeks	DSN
Approx. 2 passes/month (around maneuvers)	DSN
Other than above	ISAS

The Geotail spacecraft will be operated from the Geotail POCC at ISAS. CMD will be via Usuda.

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