Data Set Catalog #122

OGO-3   Search Coil Magnetometer

66-049A-12A   41 tapes

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM:

http://nssdc.gsfc.nasa.gov/nmc/

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There
you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

a. Associated Documents   To find associated documents you will need to
know the document ID number and then click here.
http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/

b. Core Catalog Materials

OGO 3

SEARCH COIL MAGNETOMETER

66-049A-12A

THIS DATA SET CATALOG HAS BEEN RESTORED. THERE WERE ORIGINALLY

FORTY-ONE 7-TRACK, 556 BPI TAPES, WRITTEN IN BCD. THERE ARE SEVEN

RESTORED TAPES, WRITTEN IN EBCDIC. THE DR TAPES ARE 3480 CARTRIDGES

AND THE DS TAPES ARE 9-TRACK, 6250. THERE WERE TWO BAD TAPES; D005689

AND D005690. THE ORIGINAL TAPES WERE CREATED ON AN IBM 7094 COMPUTER.

THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME

SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR003282	DS003282	D005668	1	06/09/66 - 06/11/66
		D005669	2-11	06/27/66 - 07/17/66
		D005670	12-21	07/17/66 - 08/06/66
		D005671	22-31	08/06/66 - 08/27/66
		D005672	32-41	08/27/66 - 09/15/66
DR003283	DS003283	D005673	1-10	09/16/66 - 10/06/66
		D005674	11-20	10/06/66 - 10/26/66
		D005675	21-30	10/27/66 - 11/16/66
		D005676	31-40	11/16/66 - 12/16/66
		D005677	41-50	12/06/66 - 12/25/66
DR003284	DS003284	D005678	1-10	12/06/66 - 12/25/66
		D005679	11-21	01/05/67 - 02/04/67
		D005681	22-31	02/05/67 - 02/24/67
		D005680	32-41	02/27/67 - 03/17/67
DR003285	DS003285	D005682	1-10	03/17/67 - 04/06/67
		D005683	11-19	04/06/67 - 04/24/67
		D005684	20-21	04/24/67 - 04/27/67
		D005685	22-31	04/26/67 - 05/17/67
		D005686	32-41	05/17/67 - 06/06/67
DR003286	DS003286	D005687	1-10	06/06/67 - 06/26/67
		D005688	11-20	06/26/67 - 07/16/67
		D005691	21-30	08/26/67 - 09/15/67
		D005692	31-40	09/16/67 - 10/05/67
		D005693	41-49	10/06/67 - 10/23/67

DR#	DS#	D#	FILES	TIME SPAN
DR003287	DS003287	D005694	1-9	10/23/67 - 11/11/67
		D005695	10-18	11/15/67 - 12/01/67
		D005696	19-23	12/03/67 - 12/23/67
		D005697	24-29	12/05/67 - 12/15/67
		D005698	30-34	12/23/67 - 01/02/68
		D005699	35-39	01/05/68 - 01/14/68
		D005700	40-43	01/14/68 - 01/24/68
DR003288	DS003288	D005701	1-5	01/25/68 - 02/04/68
		D005702	6-10	02/04/68 - 02/14/68
		D005703	11-15	02/14/68 - 02/24/68
		D005704	16-20	02/24/68 - 03/05/68
		D005705	21-22	03/06/68 - 03/09/68
		D005706	23-31	03/09/68 - 03/29/68
		D005707	32-36	03/29/68 - 04/08/68
		D005708	37-40	04/18/68 - 04/27/68

OGO-3 SEARCH COIL MAGNETOMETER

This data set consists of 41, 556BPI, BCD, 7-track tapes made on the IBM/7094. For each revolution there is a separate file, but there is not data for every orbit.

D#	C#	Orbits	Files	Start	Stop
D-05668	C-05016	2	1	6/9/66	6/11/66
D-05669	C-05017	11-20	10	6/27/66	7/17/66
D-05670	C-05018	21-30	10	7/17/66	8/6/66
D-05671	C-05019	31-40	10	8/6/66	8/27/66
D-05672	C-05020	41-50	10	8/27/66	9/15/66
D-05673	C-05021	51-60	10	9/16/66	10/6/66
D-05674	C-05022	61-70	10	10/6/66	10/26/66
D-05675	C-05023	71-80	10	10/27/66	11/16/66
D-05676	C-05024	81-90	10	11/16/66	12/6/66
D-05677	C-05025	91-100	10	12/6/66	12/26/66
D-05678	C-05026	101-110	10	12/26/66	1/15/67
D-05679	C-05027	111-120	10	1/15/67	2/4/67
D-05680	C-05028	131-140	10	2/27/67	3/17/67
D-05681	C-05029	121-130	10	2/5/67	2/24/67
D-05682	C-05030	141-150	10	3/17/67	4/6/67
D-05683	C-05031	151-159	9	4/6/67	4/24/67
D-05684	C-05032	160-161	2	4/24/67	4/27/67
D-05685	C-05033	161-170	10	4/26/67	5/17/67
D-05686	C-05034	171-180	10	5/17/67	6/6/67
D-05687	C-05035	181-190	10	6/6/67	6/26/67
D-05688	C-05036	191-200	10	6/26/67	7/16/67
D-05689	C-05037	116	1	1/25/67	1/27/67
D-05690					
D-05691	C-05038	221-230	10	8/26/67	9/15/67
D-05692	C-05039	231-240	10	9/16/67	10/5/67
D-05693	C-05040	241-249	9	10/6/67	10/23/67
D-05694	G-05041	250-258	9	10/23/67	11/11/67
D-05695	G-05042	260-268	9	11/15/67	12/1/67
D-05696	C-05043	270-279	5	12/3/67	11/23/67
D-05697	C-05044	271-275	5	12/5/67	12/15/67
D-05698	C-05045	280-284	5	12/23/67	1/2/68
D-05699	C-05046	286-290	5	1/5/68	1/14/68
D-06000	C-05047	291-295	5	1/14/68	1/24/68
D-06001	C-05048	296-300	5	1/25/68	2/4/68
D-06002	C-05049	301-305	5	2/4/68	2/14/68
D-06003	C-05050	306-310	5	2/14/68	2/24/68
D-06004	C-05051	311-315	5	2/24/68	3/5/68
D-06005	C-05052	316-317	2	3/6/68	3/9/68
D-06006	C-05053	318-326	9	3/9/68	3/29/68
D-06007	C-05054	328-332	5	3/29/68	4/8/68
D-06008	C-05055	338-341	4	4/18/68	4/27/68

Note: D-05690 has too many tape errors on it to be duped of listed.

The experiment number on the header records of these tapes
does not agree with experiment number assigned to the data
set by the NSSDC.

D-05685 has no header records on the 10th file.

D-05698 has a day 367 which I have assumed is meant to be day 2.

THE $B_\perp$ - θ PLOTS FOR THE OGO-1
SEARCH COIL MAGNETOMETER

The spin stabilization of the OGO-1 spacecraft makes
it possible for the search coil magnetometer to measure the
amplitude and direction of the dc magnetic field in the spin
plane of the spacecraft. The methods used to make these
measurements are described in the Appendix.

The measurements obtained are plotted in the following
three forms:

FORM ONE

    A. Vertical scales

        1. Amplitude

            1" = 10, 100, 1000 γ depending upon instrument
              gain.

        2. Phase

            1" = 100°

    B. Horizontal scale

        1.2" = 1 hour, yielding a plot 1'x6'.

FORM TWO

    A. Vertical scales (same as Form One).

    B. Horizontal scale

        0.3" = 1 hour, yielding a plot 1'x2.5'.

FORM THREE

    A. Vertical and horizontal scales are ¼ of Form One.
       For the second and third plots the data are
       averaged in groups of four then plotted at ¼ the
       time scale. We have not supplied copies of this

plot for all the orbits since the second plot,
with its larger vertical scales, is more useful
for data analysis.

APPENDIX

THE MEASUREMENT OF $B_\perp - \theta$ ON THE OGO-1 SPACECRAFT

Let B_x and B_y be two perpendicular components of the field in a plane perpendicular to the spin axis. Then, in the "rotated frame" (Z-axis parallel to the spin axis, X and Y axes in spin plane rotating with a frequency ω) the following signals will be observed:

$$X_R = B_x' \cos\omega t + B_y' \sin\omega t$$
$$Y_R = B_y' \cos\omega t - B_x' \sin\omega t$$
$$Z_R = 0$$

where $B_x' = kB_x$ and $B_y' = kB_y$. k is the product of the angular velocity of the satellite and an instrument calibration constant. If we now rotate to the coil system using the inverse of the matrix for the rotation from the coil system to the rotated frame:

$$\begin{pmatrix} X_c \\ Y_c \\ Z_c \end{pmatrix} = \begin{pmatrix} a_{11} & a_{21} & a_{31} \\ a_{12} & a_{22} & a_{32} \\ a_{13} & a_{23} & a_{33} \end{pmatrix} \begin{pmatrix} X_R \\ Y_R \\ 0 \end{pmatrix}$$

We obtain the following signals on the coils due to the spacecraft spin in a dc field:

$$X_c = a_{11} X_R + a_{21} Y_R$$
$$Y_c = a_{12} X_R + a_{22} Y_R$$
$$Z_c = a_{13} X_R + a_{23} Y_R$$

The Fourier Series Analysis of these signals gives:

(1) $2\alpha_x = a_{11}B_x' + a_{21}B_y'$ $\qquad$ $2\beta_x = a_{11}B_y' - a_{21}B_x'$

$\qquad$ $2\alpha_y = a_{12}B_x' + a_{22}B_y'$ $\qquad$ $2\beta_y = a_{12}B_y' - a_{22}B_x'$

$\qquad$ $2\alpha_z = a_{13}B_x' + a_{23}B_y'$ $\qquad$ $2\beta_z = a_{13}B_y' - a_{23}B_x'$

These can be rewritten in terms of the peak-to-peak amplitudes and phases in the coil system as follows:

(2) $2\alpha_x = X\cos\theta_x$ $\qquad\qquad$ $2\beta_x = X\sin\theta_x$

$\qquad$ $2\alpha_y = Y\cos\theta_y$ $\qquad\qquad$ $2\beta_y = Y\sin\theta_y$

$\qquad$ $2\alpha_z = Z\cos\theta_z$ $\qquad\qquad$ $2\beta_z = Z\sin\theta_z$

$\qquad$ X - Y - Z are p-p amplitudes measured in the coil system

$\qquad$ $\theta_x - \theta_y - \theta_z$ are the respective phases

Solving for B_y in equations (1) gives:

$$a_{21}2\alpha_x + a_{11}2\beta_x = (a_{21}^2 + a_{11}^2)B_y'$$

$$a_{22}2\alpha_y + a_{12}2\beta_y = (a_{22}^2 + a_{12}^2)B_y'$$

$$a_{23}2\alpha_z + a_{13}2\beta_z = (a_{23}^2 + a_{13}^2)B_y'$$

which, when summed and equations (2) are substituted gives:

$$B_y = K(a_{11}X\sin\theta_x + a_{12}Y\sin\theta_y + a_{13}Z\sin\theta_z + a_{21}X\cos\theta_x$$

$$+ a_{22}Y\cos\theta_y + a_{23}Z\cos\theta_z)$$

where $K = 1/2k$.

B_x is found in the same way.

The procedure used to determine these components of the magnetic field involves two processing steps. First