AE-C, AE-D, AE-E #394

NSSDC ANALYZED DATA

73-101A-01A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A, 13A, 14A
75-096A-01A, 2A, 3A, 4A, 7A, 9A, 10A, 11A, 12A, 13A
75-107A-01A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 16A, 19A, 08A

Table of Contents

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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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

AE-C, AE-D, AE-E

NSSDC ANALYZED DATA

73-101A-01A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A, 13A, 14A SPIO-00201

75-096A-01A, 2A, 3A, 4A, 7A, 8A, 9A, 10A, 11A, 12A, 13A SPIO-00045

75-107A-01A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 16A, 19A SPIO-00036

This data set catalog has been restored. It consists of 7 (AE-C) data tapes, 1 (AE-D) data tape, and 4 (AE-E) data tapes. The original tapes were 1600 BPI. The tapes are 9-track, 6250 BPI, Binary and are multi-filed. These tapes were created on an XDS 930 computer. and were written in IBM format. The TRF number for the documentation of each experiment is written on the top of each copy in this catalog. The TRF documents in this catalog which can be found on microfiche are B28955-60, B29091-000A and B29343-00A. The DR and DS numbers along with the time spans are as follows:

See page 8 of B22091 (in DSC) Format

Start Date can be found in word 4. Year + Day. Do a hex on all 5 digits. (last 5 in word) 1st 2 characters are the year, last 3 are the day. End Date can be found in word 9. You figure it the same way.

AE-C

The year + month can be found in word 1+2. ~~edu~~

For processing AE-C Data 73-101A-~~01A~~-14A extra long tapes may be required.

AE-C

73-101A-01A,2A,3A,4A,5A,6A,7A,8A,9A,10A,11A,12A,13A,14A

DR#	DS#	D#	FILES	TIME SPAN	
DR01073	DS01073 ✓	D40389	1-126	12/16/73 - 12/31/73	
		D40390	127-416	01/01/74 - 01/30/74	
		D29637	417-559	02/02/74 - 02/28/74	
		D30573	560-865	03/01/74 - 03/31/74	
		D30574	866-1166	04/01/74 - 04/30/74	
DR01464	DS01464	D30575	1-274	05/01/74 - 05/31/74	
		D30576	275-569	06/02/74 - 06/30/74	
		D30577	570-871	07/01/74 - 07/31/74	
		D30578	872-1209	08/01/74 - 08/31/74	
DR01465	DS01465	D30579	1-300	09/01/74 - 10/01/74	
		D30580	301-617	09/30/74 - 10/31/74	
		D30581	618-777	11/01/74 - 11/30/74	
		D30582	778-985	12/01/74 - 12/31/74	
		D30584	986-1177	01/01/75 - 01/31/75	
DR01466	DS01466	D30584	1-192	01/01/75 - 01/31/75	*
		D35043	193-322	02/28/75 - 03/31/75	
		D35044	323-473	04/01/75 - 04/30/75	
		D35045	474-579	05/01/75 - 05/27/75	
		D35046	580-612	06/02/75 - 06/25/75	
		D35047	613-661	07/01/75 - 07/30/75	
		D35048	662-680	08/05/75 - 08/27/75	
		D35049	681-701	09/02/75 - 09/30/75	
		D70237	702-712	11/05/75 - 11/12/75	
		D40376	713-728	01/17/76 - 01/31/76	
		D40377	729-776	02/01/76 - 02/29/76	
		D40378	777-887	03/01/76 - 03/31/76	
		D40379	888-987	04/01/76 - 04/30/76	
		D40380	988-1075	05/01/76 - 05/31/76	
		D40911	1076-1184	06/01/76 - 06/30/76	
		D40383	1185-1264	07/01/76 - 07/31/76	
		D40384	1265-1348	08/01/76 - 08/31/76	
		D40385	1349-~~1405~~ [illegible]	09/01/76 - 09/30/76	
DR01467	DS01467	D40386	1-63	10/01/76 - 10/30/76	
		D40387	64-146	11/01/76 - 11/30/76	
		D40388	147-260	12/01/76 - 12/31/76	
		D40381	261-354	01/01/77 - 01/31/77	
		D40382	355-429	02/01/77 - 02/28/77	
		D40886	430-~~576~~ 575	03/01/77 - 03/31/77	
		D40887	576 ~~577~~-~~767~~ 766	04/01/77 - 04/30/77	
		D40888	767 ~~768~~-~~975~~ 974	05/01/77 - 05/31/77	
		D40889	975 ~~976~~-~~1107~~ 1106	06/01/77 - 06/30/77	
		D40890	1107 ~~1108~~-~~1200~~ 1199	07/01/77 - 07/31/77	
		D40891	1200 ~~1201~~-~~1280~~ 1279	08/01/77 - 08/28/77	
		D40892	1280 ~~1281~~-~~1378~~ 1377	09/03/77 - 09/30/77	
		D40893	1378 ~~1379~~-~~1464~~ 1463	10/01/77 - 10/31/77	
		D40894	1464 ~~1465~~-~~1593~~ 1592	11/01/77 - 11/30/77	
		D32373	1593 ~~1594~~-~~1678~~ 1677	12/01/77 - 12/31/77	
		D40896	1678 ~~1679~~-~~1743~~ 1742	01/01/78 - 01/31/78	

* D30583 DATA IS LOST (02/01/75 - ~~03/01~~/75) 04/07/94
02/28

73-101A-01A,2A,3A,4A,5A,6A,7A,8A,9A,10A,11A,12A,13A,14A

DR#	DS#	D#	FILES	TIME SPAN
DR01468 ✓	DS01468 ✓	D40897	1-50	02/01/78 - 02/28/78
		D40898	51-133	03/02/78 - 03/31/78
		D40899	134-192	04/01/78 - 04/30/78
		D40900	193-243	05/01/78 - 05/31/78
		D40901	244-306	06/01/78 - 06/30/78
		D40902	307-378	07/01/78 - 07/31/78
		D40903	379-403	08/01/78 - 08/10/78
DR01074	DS01074	D40905	1-51	10/01/78 - 10/31/78
		D40906	52-102	11/01/78 - 11/30/78
		D40907	103-123	12/01/78 - 12/11/78

AE-D

75-096A-01A,2A,3A,4A,7A,8A,9A,10A,11A,12A,13A

DR#	DS#	D#	FILES	TIME SPAN
DR01075	DS01075 ✓	D31947	1-185	10/06/75 - 10/31/75
		D31946	186-476	11/01/75 - 12/01/75
		D31945	477-843	11/30/75 - 12/31/75
		D31944	844-1183	01/01/76 - 01/29/76

AE-E

75-107A-01A,2A,3A,4A,5A,6A,7A,8A,9A,10A,11A,16A,19A

DR#	DS#	D#	FILES	TIME SPAN	
DR01076	DS01076	D30585 ✓	1-28	11/21/75 - 11/27/75	
		D30586	29-280	12/01/75 - 12/31/75	
		D30587	281-438	01/01/76 - 01/28/76	
		D30588	439-610	02/01/76 - 02/29/76	
		D30589	611-737	03/01/76 - 03/30/76	
		D30590	738-832	04/01/76 - 04/30/76	
		D41935	833-932	05/01/76 - 05/31/76	
		D41936	933-1029	06/01/76 - 06/30/76	
		D41937	1030-1118	07/01/76 - 07/31/76	
		D41938	1119-1207	08/01/76 - 08/30/76	data enclosed
		D41939	1208-1265	09/01/76 - 09/30/76	lost during restoration
DR01077	DS01077	D41940	1-128	10/01/76 - 10/30/76	
		D41941	129-203	11/01/76 - 11/29/76	
		D41942	204-234	12/01/76 - 12/22/76	
		D41507	235-315	01/01/77 - 02/01/77	
		D41508	316-386	01/31/77 - 02/28/77	
		D41509	387-503	03/01/77 - 03/31/77	
		D41510	504-595	04/01/77 - 04/30/77	
		D41511	596-688	05/01/77 - 05/31/77	
		D41512	689-796	06/01/77 - 06/30/77	
		D41513	797-897	07/01/77 - 07/31/77	
		D41514	898-967	08/01/77 - 08/31/77	
		D41515	968-1016	09/02/77 - 09/29/77	
		D41516	1017-1056	10/01/77 - 10/31/77	
		D41517	1057-1141	11/01/77 - 11/28/77	
		D41518	1142-1186	12/03/77 - 12/31/77	
		D41519	1187-1229	01/01/78 - 01/31/78	
		D41520	1230-1270	02/01/78 - 02/28/78	
DR01078	DS01078	D41521	1-39	03/02/78 - 03/31/78	
		D41522	40-85	04/01/78 - 04/30/78	
		D41523	86-137	05/01/78 - 05/31/78	
		D41524	138-178	06/02/78 - 06/30/78	
		D41525	179-233	07/01/78 - 07/31/78	
		D41526	234-309	08/01/78 - 08/30/78	
		D41841	310-353	09/01/78 - 09/30/78	
		D41842	354-398	10/01/78 - 10/31/78	
		D41843	399-466	11/03/78 - 11/29/78	
		D41844	467-507	12/02/78 - 12/31/78	
		D41845	508-544	01/02/79 - 01/31/79	
		D41846	545-600	02/01/79 - 02/28/79	
		D41847	601-699	03/01/79 - 03/31/79	
		D41848	700-756	04/01/79 - 04/30/79	
		D41849	757-804	05/01/79 - 05/31/79	
		D41943	805-877	06/01/79 - 06/30/79	
		D41850	878-938	07/01/79 - 07/31/79	
		D41851	939-980	08/02/79 - 08/30/79	
		D41852	981-1009	09/01/79 - 09/30/79	
		D41853	1010-1057	10/02/79 - 10/30/79	
		D41854	1058-1096	11/01/79 - 12/01/79	

75-107A-01A,2A,3A,4A,5A,6A,7A,8A,9A,10A,11A,16A,19A

DR#	DS#	D#	FILES	TIME SPAN
DR01079	DS01079	D41855	1-57	12/01/79 - 12/30/79
		D41856	58-110	01/01/80 - 01/31/80
		D70238	111-156	02/01/80 - 02/29/80
		D70239	157-211	03/01/80 - 03/31/80
		D70240	212-265	04/01/80 - 04/30/80
		D70241	266-328	05/01/80 - 05/31/80
		D70242	329-375	06/01/80 - 06/30/80
		D70243	376-452	07/01/80 - 07/31/80
		D70244	453-505	08/01/80 - 08/31/80
		D70245	506-579	09/01/80 - 09/30/80
		D70246	580-623	10/01/80 - 10/31/80
		D70247	624-661	11/05/80 - 11/30/80
		D70248	662-707	12/01/80 - 12/28/80
		D70249	708-775	01/04/81 - 01/31/81
		D70250	776-830	02/01/81 - 02/28/81
		D70251	831-867	03/01/81 - 03/30/81
		D70252	868-890	04/01/81 - 04/30/81
		D70253	891-907	05/03/81 - 05/24/81
		D70254	908-911	06/01/81 - 06/07/81

REQ.AGENT	RAND NO.	ACQ. AGENT
CMP	RC7883	RNH
CAW	RC8502	RNH
AMP	RC8503	RNH
VJP	RD1103	MJT
SAR	V0317	RNH

AE-C,AE-D,AE-E

NSSDC ANALYZED DATA

73-101A-01A,2A,3A,4A,5A,6A,7A,8A,9A,10A,11A,12A,13A,14A

75-096A-01A,2A,3A,4A,7A,8A,9A,10A,11A,12A,13A

75-107A-01A,2A,3A,4A,5A,6A,7A,8A,9A,10A,11A,16A,19A

This data set catalog consists of 59 (AE-C) data tapes, 4 (AE-D) data tapes, and 68 (AE-E) data tapes. The tapes are 9-track, 1600 BPI, Binary and are multi-filed. These tapes were created on an XDS 930 computer. The TRF number for the documentation of each experiment is written on the top of each copy in this catalog. The TRF documents in this catalog which can be found on microfiche are B28955-60, B29091-000A and B29343-00A. The D and C numbers along with the time spans are as follows:

AE-C

D#	C#	FILES	TIME SPAN
D-4038[illegible]		126	12/16/73 - 12/31/73
D-40390		290	01/01/74 - 01/30/74
D-29637	C-19263	143	02/02/74 - 02/28/74
D-30573	C-19644	306	03/01/74 - 03/31/74
D-30574	C-19645	301	04/01/74 - 04/30/74
D-30575	C-19646	274	05/01/74 - 05/31/74
D-30576	C-19647	295	06/02/74 - 06/30/74
D-30577	C-19648	302	07/01/74 - 07/31/74
D-30578	C-19649	338	08/01/74 - 08/31/74
D-30579	C-19650	300	09/01/74 - 10/01/74
D-30580	C-19651	317	09/30/74 - 10/31/74
D-30581	C-19652	160	11/01/74 - 11/30/74
D-30582	C-19653	208	12/01/74 - 12/31/74
D-30584	C-19655	192	01/01/75 - 01/31/75
D-30583	C-19654	198	02/01/75 - 03/01/75
D-35043		130	02/28/75 - 03/31/75
D-35044		151	04/01/75 - 04/30/75
D-35045		106	05/01/75 - 05/27/75
D-35046		33	06/02/75 - 06/25/75
D-35047		49	07/01/75 - 07/30/75
D-35048		19	08/05/75 - 08/27/75
D-35049		21	09/02/75 - 09/30/75
D-70237		11	11/05/75 - 11/12/75 √
D-40376		16	01/17/76 - 01/31/76
D-40377		48	02/01/76 - 02/29/76
D-40378		111	03/01/76 - 03/31/76
D-40379		100	04/01/76 - 04/30/76
D-40380		88	05/01/76 - 05/31/76
D-40911		109	06/01/76 - 06/30/76
D-40383		80	07/01/76 - 07/31/76
D-40384		84	08/01/76 - 08/31/76
D-40385		58	09/01/76 - 09/30/76

AE-C (con't.)

D#	C#	FILES	TIME SPAN
D-40386		63	10/01/76 - 10/30/76
D-40387		83	11/01/76 - 11/30/76
D-40388		114	12/01/76 - 12/31/76
D-40381		94	~~02~~ 01/01/77 - ~~02/28~~ 01/31/77
D-40382		75	02/01/77 - 02/28/77
D-40886		147	03/01/77 - 03/31/77
D-40887		191	04/01/77 - 04/30/77
D-40888		208	05/01/77 - 05/31/77
D-40889		132	06/01/77 - 06/30/77
D-40890		93	07/01/77 - 07/31/77
D-40891		80	08/01/77 - 08/28/77
D-40892		98	09/03/77 - 09/30/77
D-40893		86	10/01/77 - 10/31/77
D-40894		129	11/01/77 - 11/30/77
D-32373	C-20215	85	12/01/77 - 12/31/77
D-40896		65	01/01/78 - 01/31/78
D-40897		50	02/01/78 - 02/28/78
D-40898		83	03/02/78 - 03/31/78
D-40899		59	04/01/78 - 04/30/78
D-40900		51	05/01/78 - 05/31/78
D-40901		63	06/01/78 - 06/30/78
D-40902		72	07/01/78 - 07/31/78
D-40903		25	08/01/78 - 08/10/78
D-40904		70	09/01/78 - 09/30/78
D-40905		~~58~~ 57	10/01/78 - 10/31/78
D-40906		51	11/01/78 - 11/30/78
D-40907		21	12/01/78 - 12/11/78

AE-D

D#	C#	FILES	TIME SPAN
D-31947	C-20154	185	10/06/75 - 10/31/75
D-31946	C-20153	291	11/01/75 - 12/01/75
D-31945	C-20152	367	11/30/75 - 12/31/75
D-31944	C-20151	340	01/01/76 - 01/29/76

AE-E

D#	C#	FILES	TIME SPAN
D-30585	C-19632	28	11/21/75 - 11/27/75
D-30586	C-19633	252	12/01/75 - 12/31/75
D-30587	C-19634	158	01/01/76 - 01/28/76
D-30588	C-19635	172	02/01/76 - 02/29/76
D-30589	C-19636	127	03/01/76 - 03/30/76
D-30590	C-19637	95	04/01/76 - 04/30/76
D-41935		100	05/01/76 - 05/31/76
D-41936		97	06/01/76 - 06/30/76
D-41937		89	07/01/76 - 07/31/76
D-41938		89	08/01/76 - 08/30/76
D-41939		58	09/01/76 - 09/30/76
D-41940		128	10/01/76 - 10/30/76
D-41941		75	11/01/76 - 11/29/76
D-41942		31	12/01/76 - 12/22/76
D-41507		81	01/01/77 - [redacted] 02/01/77
D-41508		71	01/31/77 - 02/28/77
D-41509		117	03/01/77 - 03/31/77
D-41510		92	04/01/77 - 04/30/77
D-41511		93	05/01/77 - 05/31/77
D-41512		108	06/01/77 - 06/30/77
D-41513		101	07/01/77 - 07/31/77
D-41514		70	08/01/77 - 08/31/77
D-41515		49	09/02/77 - 09/29/77

D#	C#	FILES	TIME SPAN
D-41516		40	10/01/77 - 10/31/77
D-41517		85	11/01/77 - 11/28/77
D-41518		45	12/03/77 - 12/31/77
D-41519		43	01/01/78 - 01/31/78
D-41520		41	02/01/78 - 02/28/78
D-41521		39	03/02/78 - 03/31/78
D-41522		46	04/01/78 - 04/30/78
D-41523		52	05/01/78 - 05/31/78
D-41524		41	06/02/78 - 06/30/78
D-41525		55	07/01/78 - 07/31/78
D-41526		76	08/01/78 - 08/30/78
D-41841		44	09/01/78 - 09/30/78
D-41842		45	10/01/78 - 10/31/78
D-41843		68	11/03/78 - 11/29/78
D-41844		41	12/02/78 - 12/31/78
D-41845	C-25272	37	01/02/79 - 01/31/79
D-41846	C-25273	56	02/01/79 - 02/28/79
D-41847	C-25274	99 1	03/01/79 - 03/31/79
D-41848	C-25275	57 2	04/01/79 - 04/30/79
D-41849	C-25276	48 3	05/01/79 - 05/31/79
D-41943	C-25277	73 4	06/01/79 - 06/30/79
D-41850	C-25278	61 5	07/01/79 - 07/31/79
D-41851	C-24092	42 6	08/02/79 - 08/30/79
D-41852	C-25279	29	09/01/79 - 09/30/79
D-41853	C-25280	48	10/02/79 - 10/30/79

D#	C#	FILES	TIME SPAN
D-41854	C-25281	39	11/01/79 - 12/01/79
D-41855	C-25282	57	12/01/79 - 12/30/79
D-41856	C-25283	53	01/01/80 - 01/31/80
D-70238	C-25284	46	02/01/80 - 02/29/80
D-70239	C-25285	55	03/01/80 - 03/31/80
D-70240	C-25286	54	04/01/80 - 04/30/80
D-70241	C-25287	63	05/01/80 - 05/31/80
D-70242	C-25288	47	06/01/80 - 06/30/80
D-70243	C-25289	77	07/01/80 - 07/31/80
D-70244	C-25290	53	08/01/80 - 08/31/80
D-70245	C-25291	74	09/01/80 - 09/30/80
D-70246	C-25292	44	10/01/80 - 10/31/80
D-70247	C-25293	38	11/05/80 - 11/30/80
D-70248	C-25294	46	12/01/80 - 12/28/80
D-70249	C-25295	68	01/04/81 - 01/31/81
D-70250	C-25296	55	02/01/81 - 02/28/81
D-70251	C-25297	37	03/01/81 - 03/30/81
D-70252	C-25298	23	04/01/81 - 04/30/81
D-70253	C-25299	17	05/03/81 - 05/24/81
D-70254	C-25300	4	06/01/81 - 06/07/81

DETAILED DESIGN SPECIFICATION FOR NSSDCTAPE

1. Name: NSSDCTAPE

2. Derivation Phrase: National Space Sciences Data Center TAPE

3. Purpose: NSSDCTAPE provides experimenter-reduced data to the National Space Sciences Data Center (NSSDC).

4. Routine That Generates the Tape: NSSDCOUT

5. Narrative: Each NSSDC tape contains one calendar-month of data for one satellite. The first file of the tape is a header file specifying the satellite ID, point-by-point data record size, start and stop times of the data contained on the tape, ~~and~~ a list of orbit numbers on the tape, and the Magnetic and Solar Activity data for the time period. Subsequent data files, each contains one orbit's worth of unified abstract (UA) and orbit data, are arranged in ascending order by orbit number. Each data file consists of a header record followed by approximately 145 point-by-point records. The header record contains the orbit number, orbit stop and start times, and UA header data and orbit parameters corresponding to that orbit. The point-by-point data records contain UA and orbit data at [illegible]-second intervals for the time span specified in the header record. Because there may be gaps in this data, each point-by-point record contains a corresponding time.

   If one tape cannot accommodate all data for a given satellite and month, a second tape will be generated. This tape will contain a header file identical to the header file of the first tape. The pointer to the first orbit in the header file record, however, will differ. Following the header file, the second tape will contain the remaining data files for the month being processed starting with the orbit number specified in the header file.

In creating the NSSDC tape, missing data is handled in the following manner:

a. If a data file does not exist in the UA data base (UADB) for a given orbit, or if the start and stop date/times of data within that orbit are zero (as specified in the UA directory), no file for that orbit is written on NSSDCTAPE.

b. If a data file does not have a header record in the UADB, the corresponding NSSDCTAPE data file header record UA data words (words 7-1687) will contain zero fill.

c. Corresponding point-by-point records will be created on NSSDCTAPE only for UADB point-by-point records containing nonzero data.

d. When NSSDCTAPE data file header and point-by-point reads are created, data for some experiments may be present but not for others. Missing data, in this case, is indicated with zero fill.

e. If orbit data does not exist for a given orbit or time, orbit data words will be set to 9999999.0 in the corresponding NSSDCTAPE data file header and point-by-point records.

f. If magnetic solar aspect (MSA) data does not exist for a given day, MSA data words will be set to zero for that day in the NSSDCTAPE label

6. Routines That Use the File: NSSDCTAPE

7. Tape Structure:

a. Organization--Random, free-form, variable-length records, one or two reels

b. Density--9-track, 1600-bpi

c. Contents--Each reel contains a header file followed by one or more data files and terminated by a double end-of-file mark.

d. Header File Structure--A ~~variable~~ Fixed-length label record followed by an end-of-file mark.

e. Data File Structure--A header record followed by fixed-length, point-by-point data records and terminated by an end-of-file mark.

f. Header File Label Record Format--The Header File Label record format is described in Tables 1 and 6. A label record ~~may be a maximum of~~ is ~~100~~ 1059 words long.

g. Data File Header Record Format--Tables 2 and 3 describe the header record format. A header record consists of 1700 words.

h. Data File Point-by-Point Record Format--Tables 4 and 5 describe the point-by-point record format. The record length is fixed for each tape but varies by satellite (126, 128, and 122 words for satellites C, D, and E, respectively). Records are blocked, 13 records per physical block.

Table 1. Label Record

WORD	TYPE	CONTENTS
1	I	YEAR (2 DIGITS) or start orbit (5 digits)
2	I	MONTH (1–12) or stop orbit (5 digits)
3	I	SATELLITE ID: = 0, FOR AE-C; = 1, FOR AE-D; = 2, FOR AE-E
4	I	DATA FILE POINT-BY-POINT RECORD LENGTH (IN WORDS)
5	I	NUMBER OF DATA FILES ON TAPE[1]
6	I	POINTER TO ORBIT NUMBER OF FIRST FILE ON THIS REEL (RELATIVE TO BEGINNING OF ORBIT NUMBER TABLE)
7	I	START DATE ON TAPE[1] (IN THE FORM yyddd, WHERE yy = YEAR, ddd = JULIAN DAY OF YEAR)
8	I	START TIME ON TAPE[1] (MILLISECONDS OF DAY)
9	I	STOP DATE ON TAPE[1]
10	I	STOP TIME ON TAPE[1]
11	I	Data select option (0=by month, 1=by orbit)
12-15		SPARES
16–400	I	TABLE OF ORBIT NUMBER OF FILES ON THE TAPE[1] IN ORDER OF WHICH THE FILES APPEAR ON THE TAPE

[1]INCLUDING BOTH REELS IF THIS IS A TWO-REEL TAPE.

401-422 1 Magnetic Solar Activity data (see Table 6) for start day on tape[1]

4[illegible]2-1582 1 Repeat of words 401-422 for each additional day of data included on the tape[1]

Table 2. Header Record

WORD	TYPE	CONTENTS	UNITS
1	F	FLAG WORD (99999.)	
2	I	ORBIT START DATE	YYDDD
3	I	ORBIT START TIME	MILLISECONDS OF DAY
4	I	ORBIT STOP DATE	YYDDD
5	I	ORBIT STOP TIME	MILLISECONDS OF DAY
6	I	ORBIT NUMBER	
7–1687	F	UNIFIED ABSTRACT HEADER DATA (SEE TABLE 3)	
1688	F	PREDICT/DEFINITIVE ORBIT FLAG = 0, DEFINITIVE, = 1, PREDICTED	
1689	F	PERIOD (p)	MINUTES
1690	F	INCLINATION (i)	DEGREES
[illegible]	F	ECCENTRICITY (e)	
1692	F	SEMIMAJOR AXIS (a)	KILOMETERS
1693	F	ARGUMENT OF PERIGEE (ω)	DEGREES
1694	F	RIGHT ASCENSION OF ASCENDING NODE (Ω)	DEGREES
1695–1697	F	GEI VECTOR NORMAL TO ORBIT PLANE (IN DIRECTION P x V)	UNIT VECTOR
[illegible]	F	APOGEE HEIGHT	KILOMETERS
[illegible]	F	PERIGEE HEIGHT	KILOMETERS
1700	F	ORBIT NUMBER	

Table 3. Unified Abstract Header Record Data

WORD	EXPERIMENTER ACCOUNT		
	AE-C	AE-D	AE-E
7–16 (10)	BIMS	PACT	BIMS
17–26 (10)	CEP	CEP	CEP
27–36 (10)	ESUM	ESUM	ESUM
37–46 (10)	EUVS	EUVS	EUVS
47–56 (10)	LEE	LEE	BUV
57–66 (10)	MESA	MESA	MESA
67–76 (10)	MIMS	MIMS	EAST
77–86 (10)	NACE	NACE	NACE
87–96 (10)	NATE	NATE	NATE
97–106 (10)	OSS	OSS	OSS
107–116 (10)	PES	PES	PES
117–126 (10)	RPA	RPA	RPA
127–136 (10)	URNO	UVNO	SPARES
137–146 (10)	VAE	VAE	VAE
147–156 (10)	SPARES	SPARES	SPARES
157–163 (7)	ESUM	ESUM	ESUM
164–207 (44)	UVNO	UVNO	SPARES
208–387 (180)	VAE	VAE	VAE
388–1687 (1300)	EUVS	EUVS	EUVS

Table 4. Data Record (1 of 3)

WORD	TYPE	CONTENTS	UNITS
1	I	DATE	YYDDD
2	I	TIME	MILLISECONDS OF DAY
3	F	TIME FROM PERIGEE	SECONDS
4	F	SUNLIGHT/DARKNESS FLAG = 0, DARKNESS, = 1, SUNLIGHT	
5	F	GREENWICH SIDEREAL TIME (GST) ANGLE MEASURED EASTWARD FROM THE FIRST POINT OF ARIES TO THE GREENWICH MERIDIAN. GST_0 WILL BE STORED ONCE PER DAY AT 0^h U. T. ($\equiv t_0$). $GST = GST_0 + \omega(t - t_0)$.	RADIANS
6–8	F	GEI VECTOR TOWARD SUN (S_x S_y S_z)	UNIT VECTOR
9–11	F	GEI VECTOR FROM SATELLITE TOWARD MOON (M_x M_y M_z)	KILOMETERS
12–14	F	GEI SATELLITE POSITION VECTOR (P_x P_y P_z)	KILOMETERS
15–17	F	GEI SATELLITE VELOCITY VECTOR (V_x V_y V_z) EACH VELOCITY COMPONENT WILL BE EVALUATED USING THE 4TH DEGREE POLYNOMIAL DERIVED FROM THE 5TH DEGREE FIT TO THE CORRESPONDING POSITION COMPONENT.	KILOMETERS PER SECOND
18–20	F	GEI SATELLITE VELOCITY RELATIVE TO ROTATING ATMOSPHERE (R_x R_y R_z) $R_x = V_x + \omega P_y$ $R_y = V_y - \omega P_x$ $R_z = V_z$	KILOMETERS PER SECOND

Table 4. Data Record (2 of 3)

WORD	TYPE	DESCRIPTION	UNITS
21	F	HEIGHT ABOVE SPHERIOD (h) FIRST COMPUTE $r = \sqrt{P_x^2 + P_y^2 + P_z^2}$ AND SIN $\varphi' = P_z/r$ THEN $h = r - R_e\,[1 - (f + 3/2f^2)\,\text{SIN}^2\,\varphi' + 3/2f^2\,\text{SIN}^4\,\varphi']$	KILOMETERS
22	F	GEODETIC LATITUDE OF SUBSATELLITE POINT (φ) FIRST COMPUTE TAN $\varphi' = P_z / \sqrt{P_x^2 + P_y^2}$ THEN APPROXIMATE THE SUBSATELLITE POINT BY THE INTERSECTION OF THE RADIUS VECTOR WITH THE SPHERIOD AND CALCULATE ITS GEODETIC LATITUDE: $\varphi = \frac{180}{\pi}\ \text{TAN}^{-1}\,[(1-f)^{-2}\,\text{TAN}\,\varphi']$	DEGREES
23	F	EAST LONGITUDE OF SATELLITE (λ) $\lambda = \frac{180}{\pi}\ [\text{ATAN2}\,(P_y, P_x) - \text{GST}]$	DEGREES
24	F	MINIMUM RAY HEIGHT	KILOMETERS
[illegible]	F	MINIMUM RAY LATITUDE IF $(P \cdot S) > 0$, LET $Q = P$. IF $(P \cdot S) < 0$, CALCULATE $Q = P - (P \cdot S)S$. APPROXIMATE HEIGHT AND LATITUDE AS FOR PARAMETERS 32 AND 33 USING Q IN PLACE OF P	DEGREES
[illegible]	F	LOCAL APPARENT SOLAR TIME $12 + \frac{12}{\pi}\ \text{ATAN2}\,(P_yS_x - P_xS_y,\ P_xS_x + P_yS_y)$	HOURS
27	F	LOCAL MAGNETIC TIME SUPPOSE φ'_n AND λ_n ARE GEOCENTRIC LATITUDE AND EAST LONGITUDE OF NORTH MAGNETIC POLE: FIRST COMPUTE UNIT VECTOR, N, TOWARD MAGNETIC POLE $N_x = \text{SIN}\,\varphi'_n\ \text{COS}\,(\lambda_n + \text{GST})$ $N_y = \text{SIN}\,\varphi'_n\ \text{SIN}\,(\lambda_n + \text{GST})$ $N_z = \text{COS}\,\varphi'_n$ THEN COMPUTE SUN IN PLANE OF MAGNETIC EQUATOR $SX = S - (S \cdot N)N$ $SY = N \times SX$ THEN LOCAL MAGNETIC TIME = ATAN2 (P SY, P SX)	HOURS
[illegible]	F	McILWAIN'S SHELL PARAMETER (L)	EARTH RAD

Table 4. Data Record (3 of 3)

MAP NO.	TYPE	DESCRIPTION	UNITS
29	F	INVARIENT LATITUDE $= \frac{180}{\pi} \cos^{-1} \cdot \sqrt{1/L}$	DEGREES
30	F	MAGNETIC FIELD STRENGTH ($\lvert B \rvert$)	GAUSS
31–33	F	GEI MAGNETIC FIELD VECTOR ($B_x\ B_y\ B_z$)	GAUSS
34–36	F	POLAR COMPONENTS OF MAGNETIC FIELD ($B_r\ B_\theta\ B_\varphi$) FIRST COMPUTE UNIT VECTORS IN THE DIRECTIONS $1_r = P / \sqrt{P_x^2 + P_y^2 + P_z^2}$ $1_\varphi = \langle -P_y, P_x, 0 \rangle / \sqrt{P_x^2 + P_y^2}$ $1_\theta = 1_\varphi \times 1_r$ THEN THE POLAR COMPONENTS OF THE FIELD ARE $B_r = B \cdot 1_r$ $B_\theta = B \cdot 1_\phi$ $B_\varphi = B \cdot 1_\varphi$	GAUSS
37	F	GEOCENTRIC MAGNETIC INCLINATION (I) $I = \frac{180}{\pi} \sin^{-1} (-B_r / \lvert B \rvert)$	DEGREES
38–40	F	GEI COORDINATES OF INGRESS (NORTH) ($I_x\ I_y\ I_z$) INTERSECT OF MAGNETIC FIELD LINE THROUGH SATELLITE	KILOMETERS
41–43	F	GEI COORDINATES OF EGRESS (SOUTH) ($E_x\ E_y\ E_z$) INTERSECT POINT	KILOMETERS
44, 45	F	GEODETIC LATITUDE AND LONGITUDE OF INGRESS POINT ($\varphi\ A_1$) $\varphi_I = \frac{180}{\pi} \tan^{-1} [(1-f)^{-2} I_z / \sqrt{I_x^2 + I_y^2}$ $\lambda_I = \frac{180}{\pi} [\mathrm{ATAN2}\ (I_y, I_x) - \mathrm{GST}]$	DEGREES
46, 47	F	GEODETIC LATITUDE AND LONGITUDE OF EGRESS POINT ($\varphi_E\ \lambda_E$)	DEGREES
48–120 120 122	F	UNIFIED ABSTRACT DATA FOR SATELLITES C, D, AND E (SEE TABLE 5)	

Table 5. Unified Abstract Point-by-Point Data

AE-C		AE-D		AE-E	
WORD	ACCOUNT	WORD	ACCOUNT	WORD	ACCOUNT
48–57 (10)	BIMS	48–57 (10)	PACT	48–57 (10)	BIMS
58–61 (4)	CEP	58–61 (4)	CEP	58–61 (4)	CEP
62–69 (8)	LEE	62–70 (9)	LEE	62–69 (8)	BUV
70–71 (2)	MESA	71–72 (2)	MESA	70–71 (2)	MESA
72–81 (10)	MIMS	73–82 (10)	MIMS	72–81 (10)	EAST
82–87 (6)	NACE	83–88 (6)	NACE	82–87 (6)	NACE
88–92 (5)	NATE	89–95 (7)	NATE	88–94 (7)	NATE
93–98 (6)	OSS	96–102 (7)	OSS	95–101 (7)	OSS
99–104 (6)	PES	103–108 (6)	PES	102–107 (6)	PES
105–113 (9)	RPA	109–117 (9)	RPA	108–116 (9)	RPA
114–118 (5)	UVNO	118–122 (5)	UVNO	117–122 (6)	VAE
119–124 (6)	VAE	123–128 (6)	VAE		
125 (1)	NATE				
126 (1)	OSS				

Table ~~2-2.~~ 6. Magnetic Solar Aspect Data ~~Returned Parameters From MAREAD~~

(WORD)

LOCATION IN DATA	SYMBOL	TYPE	DESCRIPTION
~~DATA(1)~~ 401		INTEGER	A FIVE-DIGIT NUMBER OF THE FORM yyddd WHICH SPECIFIES THE YEAR (e.g., 73) AND JULIAN DAY OF YEAR (e.g., JANUARY 1ST = 001) OF THE RETURNED DATA
~~DATA(2)~~ 402	A_p^1	INTEGER	PLANETARY AMPLITUDE AT MIDNIGHT GMT
~~DATA(3)~~ 403	A_p^2	INTEGER	PLANETARY AMPLITUDE AT 0300 GMT
~~DATA(4)~~ 404	A_p^3	INTEGER	PLANETARY AMPLITUDE AT 0600 GMT
~~DATA(5)~~ 405	A_p^4	INTEGER	PLANETARY AMPLITUDE AT 0900 GMT
~~DATA(6)~~ 406	A_p^5	INTEGER	PLANETARY AMPLITUDE AT 1200 GMT
~~DATA(7)~~ 407	A_p^6	INTEGER	PLANETARY AMPLITUDE AT 1500 GMT
~~DATA(8)~~ 408	A_p^7	INTEGER	PLANETARY AMPLITUDE AT 1800 GMT
~~DATA(9)~~ 409	A_p^8	INTEGER	PLANETARY AMPLITUDE AT 2100 GMT
~~DATA(10)~~ 410	A_p	INTEGER	AVERAGE PLANETARY AMPLITUDE
~~DATA(11)~~ 411	K_p	INTEGER	PLANETARY RANGE INDEX AT MIDNIGHT GMT
~~DATA(12)~~ 412	K_p^2	INTEGER	PLANETARY RANGE INDEX AT 0300 GMT
~~DATA(13)~~ 413	K_p^3	INTEGER	PLANETARY RANGE INDEX AT 0600 GMT
~~DATA(14)~~ 414	K_p^4	INTEGER	PLANETARY RANGE INDEX AT 0900 GMT
~~DATA(15)~~ 415	K_p^5	INTEGER	PLANETARY RANGE INDEX AT 1200 GMT
~~DATA(16)~~ 416	K_p^6	INTEGER	PLANETARY RANGE INDEX AT 1500 GMT
~~DATA(17)~~ 417	K_p^7	INTEGER	PLANETARY RANGE INDEX AT 1800 GMT
~~DATA(18)~~ 418	K_p^8	INTEGER	PLANETARY RANGE INDEX AT 2100 GMT
~~DATA(19)~~ 419	K_p	INTEGER	STORAGE INDICATOR = 1, INITIAL = SUM OF K_p's IF RECORD HAS BEEN UPDATED
~~DATA(20)~~ 420	$S_{10.7}$	REAL	OBSERVED SOLAR RADIATION FLUX
~~DATA(21)~~ 421	$S_{10.7}$	REAL	CORRECTED SOLAR RADIATION FLUX
~~DATA(22)~~ 422		INTEGER	FLUX CODE

NASA

DATA SET LLD

B12600-000A

HCK:1?

Also See B05450

Not Found

SYSTEM OPERATIONS
1st AEROSPACE CONTROL SQUADRON
Ent Air Force Base, Colorado
80912
March 1972

AEROSPACE DATA ANALYSIS

PROGRAM NUMBER 72 - 1

CATALOG OF PRECISION REDUCED BAKER-NUNN OBSERVATIONS FOR 1971

73-101A-04
75-096A-04

Compiled by

Data Production Section

APPROVED BY: Dennis L Butler

TABLE OF CONTENTS

ABSTRACT

This catalog contains the precision reduced observations obtained from the military and SAO Baker-Nunn Cameras for the calender year 1971. Since this catalog has been produced in previous years, a detailed introduction has been omitted. For additional information on the methods of data reduction and quality control used to compile this catalog, refer to 9ADD Analysis Memorandum Number 68-15, "Catalog of Precisely Reduced Observations for 1967".

1. INTRODUCTION. Under NORAD, the military now operates its own network of 5 Baker-Nunn Satellite Tracking Cameras. One camera (at Cold Lake) is owned and operated by the Royal Canadian Air Force, while the cameras located at Edwards AFB (California), San Vito (Italy), Mt. John (New Zealand), and Sand Island (Johnston Island Atoll, Central Pacific) are operated by the U.S. Air Force. Additional data used in this publication is provided by the SAO (Smithsonian Astrophysical Observatory) Baker-Nunn camera located at Island Lagoon, Australia. The operations of the Baker-Nunn Satellite Tracking Camera are described in detail in Ref. a.

2. DATA GENERATION. The methods used to generate the data reported in the catalog have been described in previous documents (Ref. b). Briefly, observations are field reduced on site to determine the postion of the satellite to within 1½ minutes of arc. The resulting measurements are then sent to Colorado Springs where the data is input to the computer program AUPRE (AUtomatic PREcision Reduction). In the precision reduction process, the satellite and several background stars are measured on each film frame. From these measurements, right ascension

and declination per star are computed and then matched with those of the SAO star catalog. The satellite position is computed in an over-determined least squares solution using the position data of the background stars. The observations output from AUPRE are accurate to less than 10 seconds of arc. Also included in the output are catalog cards, from which this present catalog is compiled.

3. ARRANGEMENT OF THE CATALOG. This catalog provides the following information:

a. On the first line of every page the identification of the satellite in several forms:

(1) International Designator.

(2) Common Name (if any).

(3) Space Defense Center catalog number.

b. For each observation it gives:

(1) The date and time of the observation in UT (Universal Time), corrected for shutter sweep and flutter.

(2) The position of the satellite in right ascension and declination with respect to the mean equator and mean equinox of 1950.0.

(3) A quantity labeled RMS, which is a measure of the uncertainty of the satellite position. The smaller the RMS,

the better the least squares solution. It is given in milliseconds of time for right ascension and seconds and hundredths of seconds of arc for declination.

(4) SDC sensor number of the Baker-Nunn station, according to the table:

028 San Vito, Italy

029 Mt. John, New Zealand

030 Edwards AFB, California

031 Sand Island

032 Cold Lake, Canada

040 Island Lagoon, Australia

4. SUMMARY. This catalog contains the precision reduced Baker-Nunn observations for 1971. A statistical summary of the number of observations by satellite and by sensor is given in the following table: (see next page)

Satellite-Sensor Totals

Satellite \ Sensor	028	029	030	031	032	040	Total
192	16	29	0	0	0	0	45
271	0	33	0	0	0	62	95
899	17	2	19	0	0	0	38
1328	48	22	13	0	0	0	83
1726	50	539	74	76	0	0	739
2253	286	54	0	0	0	0	340
2255	0	157	0	0	0	180	337
2609	0	9	0	9	1	0	19
2674	43	9	18	8	0	0	78
2680	51	17	47	7	0	0	122
3093	85	85	20	26	1	0	217
3173	0	10	0	0	0	10	20
3174	0	24	0	0	0	29	53
3307	0	121	0	0	0	119	240
3771	0	9	0	0	0	9	18
4630	9	4	0	0	0	0	13
Total	605	1124	191	126	2	409	2457

SATELLITE 1961 A DEL 1 MIDAS 4 SDC NUMBER 192

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	2	17	16	56,0059	18	36	36,581	0.25	-48	29	31.06	0.60	29
1971	8	2	17	17	4,0064	18	38	28,474	0,76	-48	3	56,88	0,63	29
1971	8	2	17	17	12,0064	18	40	17,929	0.44	-47	38	10,25	0,61	29
1971	8	2	17	17	20,0066	18	42	5.616	0,59	-47	12	17,66	0.63	29
1971	8	2	17	17	28,0065	18	43	50,760	0.65	-46	46	17,69	0.50	29
1971	8	2	17	17	36,0066	18	45	33,719	0,50	-46	20	15,44	0.35	29
1971	8	2	17	17	44,0067	18	47	14,102	0.98	-45	54	8,54	1.98	29
1971	8	2	17	17	52,0067	18	48	53,326	0,53	-45	27	43,04	0.42	29
1971	8	2	17	18	0,0064	18	50	29.705	0.50	-45	1	17,14	0.56	29
1971	8	2	17	18	8,0065	18	52	4,409	0.16	-44	34	49,95	0.55	29
1971	8	3	21	39	7,9971	23	31	12,849	0,76	10	48	37,65	0.90	28
1971	8	3	21	39	31,9970	23	32	2.375	0.45	12	23	59,53	2.43	28
1971	8	3	21	40	19,9983	23	33	53,419	0,51	15	39	9,62	2.04	28
1971	8	9	21	32	0,0073	23	31	16,016	1,65	12	48	49,43	2,64	28
1971	8	9	21	32	24,0073	23	32	4,229	0,71	14	30	23,19	1,94	28
1971	8	9	21	32	32,0077	23	32	21,125	2.72	15	4	33,74	1.71	28
1971	8	9	21	32	40,0081	23	32	39,043	1,32	15	38	39,30	2.16	28
1971	8	9	21	32	48,0075	23	32	57,052	0,42	16	13	19,76	1,51	28
1971	8	9	21	32	56,0087	23	33	15,679	0,63	16	48	1,83	1.57	28
1971	8	9	21	33	4,0085	23	33	34,760	0.71	17	22	57,99	1,62	28
1971	8	9	21	33	12,0090	23	33	54.294	0,87	17	57	55,78	0,69	28
1971	8	10	16	12	0,0049	18	43	29,615	0,19	-54	1	13,26	0.61	29
1971	8	10	16	12	8,0052	18	45	44,232	0,16	-53	32	53,31	0.41	29
1971	8	10	16	12	16,0057	18	47	55,518	0.29	-53	4	20,59	0.79	29
1971	8	10	16	12	24,0056	18	50	3,805	0,28	-52	35	30,33	0,54	29
1971	8	10	16	12	32,0058	18	52	8,438	0,56	-52	6	33,78	0,53	29
1971	8	10	16	12	40,0059	18	54	10,205	0,55	-51	37	26,44	0,67	29
1971	8	10	16	12	48,0058	18	56	8,868	0,58	-51	8	2,32	0.29	29
1971	8	10	16	12	56,0059	18	58	4.482	0,73	-50	38	32,70	0.76	29
1971	8	10	16	13	4,0057	18	59	57.455	0.44	-50	8	55,65	0,78	29
1971	8	10	16	13	12,0056	19	1	47.522	0.46	-49	39	8,66	0.57	29
1971	8	14	20	31	50,3814	23	59	31,269	0.30	16	6	7,11	1.29	28
1971	8	14	20	32	6,3827	0	0	24,763	0.27	17	5	39,12	1.15	28
1971	8	14	20	32	22,3840	0	1	20,752	0,25	18	5	39,66	1,95	28
1971	8	14	20	32	38,3856	0	2	19,701	0.33	19	6	14,04	2.12	28
1971	8	14	20	32	54,3875	0	3	21,309	0,35	20	7	11,88	1.37	28
1971	8	27	14	56	0,0097	19	8	59,494	0,22	-56	42	40,08	1,01	29
1971	8	27	14	56	8,0097	19	11	19,337	0,56	-56	11	45,09	0.70	29
1971	8	27	14	56	24,0101	19	15	47,578	0,68	-55	9	5,94	0,83	29
1971	8	27	14	56	32,0102	19	17	55,840	0,42	-54	37	30,12	0,84	29
1971	8	27	14	56	40,0102	19	20	0,236	0.21	-54	5	39,68	0,28	29
1971	8	27	14	56	48,0095	19	22	1,190	0.30	-53	33	42,13	0,47	29
1971	8	27	14	56	56,0104	19	23	59,231	0.35	-53	1	26,18	0.75	29

SATELLITE 1965 032 A BE C SDC NUMBER 1328

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	18	19	30	13.4327	16	6	57.076	0.81	35	28	56.56	0.53	28
1971	8	18	19	30	17.4328	16	13	57.981	1.64	35	40	30.47	1.27	28
1971	8	18	19	30	21.4330	16	21	8.665	0.96	35	50	47.62	0.46	28
1971	8	18	19	30	25.4333	16	28	28.563	0.93	35	59	32.08	1.13	28
1971	8	20	17	5	9.3576	2	26	28.650	0.57	-2	13	51.55	0.63	29
1971	8	20	17	5	17.3580	2	33	35.362	0.60	-2	52	2.69	0.90	29
1971	8	20	17	5	33.3574	2	48	3.205	0.65	-4	7	29.04	0.22	29
1971	8	21	16	28	2.5398	5	19	7.391	0.48	-10	49	14.65	0.61	29
1971	8	22	18	42	24.2763	18	48	55.741	1.08	16	40	40.91	0.84	28
1971	8	22	18	42	26.2763	18	51	48.507	1.02	16	23	14.60	0.64	28
1971	8	22	18	42	28.2786	18	54	39.824	1.08	16	5	47.05	0.93	28
1971	8	22	18	42	30.2787	18	57	28.521	0.43	15	48	15.41	0.73	28
1971	8	22	18	42	32.2787	19	0	16.036	0.46	15	30	45.68	0.74	28
1971	8	25	17	26	18.2771	0	18	57.990	0.55	-20	8	32.11	0.40	29
1971	8	25	17	31	46.4044	6	17	54.326	0.58	-20	26	15.46	1.53	29
1971	8	25	17	31	54.4040	6	23	35.971	0.38	-19	54	0.57	0.84	29
1971	8	25	17	32	2.4035	6	29	4.791	0.77	-19	21	52.36	0.98	29
1971	8	25	17	32	10.4044	6	34	21.386	0.52	-18	50	2.94	0.63	29
1971	8	25	17	32	22.4061	6	41	55.339	0.48	-18	2	43.23	0.97	29
1971	10	9	2	58	52.8024	4	33	57.032	0.93	9	27	38.81	0.86	28
1971	10	9	2	58	56.8025	4	38	5.212	0.51	9	5	16.13	0.33	28
1971	10	9	2	59	0.8026	4	42	12.185	0.81	8	42	40.04	1.30	28
1971	10	9	2	59	4.8037	4	46	17.198	1.32	8	19	48.87	0.81	28
1971	10	9	2	59	8.8027	4	50	21.288	0.85	7	56	46.45	0.93	28
1971	10	19	17	34	8.2275	22	11	41.993	1.37	-4	29	6.13	1.50	28
1971	10	19	17	34	12.2274	22	16	9.717	1.15	-4	1	31.93	0.87	28
1971	10	19	17	34	16.2273	22	20	39.455	0.99	-3	33	47.14	0.72	28
1971	10	19	17	34	24.2270	22	29	32.350	1.14	-2	39	34.11	1.16	28
1971	10	19	17	34	28.2268	22	33	59.906	0.41	-2	12	20.49	0.53	28
1971	11	6	13	44	1.4211	6	56	14.935	0.70	-8	49	4.28	0.43	29
1971	11	6	13	44	9.4212	7	2	51.760	0.51	-9	10	3.43	0.69	29
1971	11	6	13	44	17.4218	7	9	20.724	0.70	-9	29	40.45	0.51	29
1971	11	6	13	44	25.4214	7	15	42.497	0.79	-9	47	53.60	0.90	29
1971	11	30	10	33	52.6509	23	38	45.253	0.57	-1	51	52.27	0.76	29
1971	11	30	10	34	8.6508	23	54	19.672	0.43	0	46	42.40	0.56	29
1971	11	30	10	34	24.6507	0	10	23.243	0.64	0	23	57.01	0.74	29
1971	12	8	2	24	53.6830	11	38	8.870	0.57	36	16	28.05	1.07	28
1971	12	8	2	25	1.6832	11	46	29.654	0.77	35	42	35.62	0.81	28
1971	12	8	2	25	9.6747	11	54	27.819	0.92	35	7	45.20	1.28	28
1971	12	8	2	25	17.6751	12	2	3.951	1.50	34	32	10.10	2.32	28
1971	12	13	2	48	38.2070	12	18	14.079	0.26	20	19	3.93	0.60	28

SATELLITE 1965 032 A RE C SDC NUMBER 1328

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	2	27	11	28	6,6997	17	35	4.293	0.86	7	42	29.25	0.17	30
1971	3	2	18	8	19,6648	12	2	19.806	4.47	33	10	24,65	5,72	30
1971	3	3	12	28	36,0706	12	48	31.617	1.70	42	26	48,98	2.38	30
1971	3	3	12	29	7,9086	13	26	39.625	1.54	48	6	50.17	0.36	30
1971	3	3	12	29	24,0803	13	49	39,275	1.26	50	43	45,72	1.07	30
1971	3	6	12	24	11,6183	20	0	35.455	0.65	50	23	48,69	1,83	30
1971	3	6	12	24	27,6087	20	11	8,035	1.04	48	11	37,61	1,81	30
1971	3	7	8	41	31,2806	12	28	41.409	0.77	43	15	43,29	0,99	30
1971	3	7	8	46	21,3497	19	37	54,030	1.17	38	36	9,81	0,83	30
1971	3	7	11	40	43,5586	15	42	14.519	0.39	65	25	44,63	0,49	30
1971	3	7	11	40	51,5573	16	2	53,361	0,23	65	14	9,91	0.28	30
1971	3	7	11	40	59,5583	16	22	49,422	1,26	64	52	57,55	0.65	30
1971	3	7	11	41	15,5576	16	59	47,448	0,82	63	45	26,31	0,71	30
1971	8	11	20	30	18,0007	19	50	42,314	0,87	45	0	54,81	0.86	28
1971	8	11	20	30	20,0120	19	55	9,332	1,56	44	54	45,27	0,71	28
1971	8	11	20	30	22,0008	19	59	32,388	0,90	44	47	59,99	1,42	28
1971	8	11	20	30	24,0008	20	3	58,568	0.46	44	40	29,76	1.00	28
1971	8	11	20	30	26,0008	20	8	21,712	0,98	44	32	27,61	0.60	28
1971	8	11	20	30	28,0009	20	12	39,209	1.05	44	23	56,64	0.68	28
1971	8	11	20	30	30,0009	20	16	54,465	1,54	44	14	50,55	1,01	28
1971	8	11	20	30	32,0009	20	21	8,239	0.37	44	5	13,38	0.49	28
1971	8	11	20	30	35,9987	20	29	21.474	0,81	43	44	37,83	0,52	28
1971	8	11	20	30	37,9987	20	33	27,585	0,85	43	33	28,18	0,98	28
1971	8	12	19	50	24,0224	21	11	37,473	0,82	38	29	11,75	1,37	28
1971	8	12	19	50	32,0222	21	23	12,266	1.48	37	29	15,90	2,56	28
1971	8	12	19	50	36,0218	21	28	39,802	1.09	36	58	58,24	1.02	28
1971	8	12	19	50	40,0172	21	33	57,428	1,55	36	28	14,41	1.10	28
1971	8	12	19	50	44,0069	21	39	3,058	0.98	35	57	38,58	0.42	28
1971	8	12	19	50	47,9922	21	43	59,165	0,76	35	26	42,68	0.58	28
1971	8	12	19	50	51,9977	21	48	44,147	0.41	34	55	47,67	1.73	28
1971	8	12	19	50	55,9941	21	53	18,495	1,27	34	25	8,76	0.68	28
1971	8	12	19	50	59,9941	21	57	43,493	1.04	33	54	33,09	0.77	28
1971	8	13	18	7	41,1439	5	59	56,231	0,28	4	13	48,41	0.83	29
1971	8	13	18	7	49,1433	6	4	45,645	0,39	3	42	36,77	0,73	29
1971	8	13	18	7	57,1436	6	9	32,919	0,36	3	12	7,31	1,22	29
1971	8	13	18	8	5,1433	6	14	17.854	0,79	2	42	8,95	0.95	29
1971	8	13	18	8	13,1432	6	18	59,746	1.02	2	12	48,18	0.66	29
1971	8	14	28	21	6,0332	19	1	10,643	0.46	42	23	35.13	0.90	28
1971	8	14	28	21	8,0331	19	5	38,570	0,75	42	17	3,10	0.97	28
1971	8	14	28	21	10,0331	19	10	5,765	0,63	42	9	57,31	0.30	28
1971	8	14	28	21	12,0331	19	14	31,033	0,60	42	2	14,53	0,51	28
1971	8	14	28	21	18,0330	19	27	37,770	0.51	41	35	20,37	0.17	28
1971	8	18	18	30	9,4324	16	0	5.981	2.96	35	15	56.44	1.16	28

SATELLITE 1964 064 A BE B(S-66A) SDC NUMBER 899

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	1	10	13	38	4,0366	12	13	39,749	0.43	-11	0	50.45	1.55	30
1971	1	10	13	38	20,0642	12	15	6,244	0.45	-7	2	15.72	2.87	30
1971	1	10	13	38	36,0314	12	16	38,155	0.63	-2	38	42.82	0.69	30
1971	1	10	13	38	52,0280	12	18	15,825	0.25	2	10	54.83	2.63	30
1971	1	14	11	56	15,5982	15	58	18,018	0.85	5	41	35,18	2.66	30
1971	1	14	11	56	31,6067	16	5	53,166	0.94	8	44	1,64	1,98	30
1971	1	14	13	44	24,3888	7	45	20,568	1,01	60	51	48,28	2,00	30
1971	1	14	13	44	40,3853	7	22	3,013	0,62	63	27	45,70	0,92	30
1971	1	15	12	21	44,4213	14	9	7,108	0.53	-9	39	1,35	1.41	30
1971	1	15	12	22	0,4233	14	15	40,792	0,52	-5	49	47,99	1.69	30
1971	1	15	12	22	32,4269	14	30	34,384	0,85	2	37	11,57	2,86	30
1971	1	15	12	22	48,4439	14	38	57,339	0,51	7	10	49,74	1.80	30
1971	3	28	4	9	37,1281	3	57	49,728	0.48	12	14	23,69	1.63	30
1971	4	3	3	19	23,6723	3	40	14,865	0,79	8	2	21,19	0,79	30
1971	4	3	3	22	8,5714	1	58	21,169	0,20	50	2	41,62	3,30	30
1971	4	6	12	11	50,1781	20	34	47,419	0,23	19	52	12,49	1,63	30
1971	4	10	17	48	48,9334	19	21	41,963	0.34	-3	26	59.78	0,89	29
1971	5	19	20	41	59,9970	20	33	46,079	0.77	56	6	2.04	0.71	28
1971	5	19	20	42	1,9971	20	31	5,164	0.53	55	49	51,56	0,96	28
1971	5	19	20	42	4,0133	20	28	25,936	0.78	55	33	35,62	0.80	28
1971	5	19	20	42	6,0134	20	25	49,215	1.18	55	16	56.89	0,82	28
1971	5	19	20	42	8,0134	20	23	12,581	1,26	54	59	59,37	1,77	28
1971	5	19	20	42	10,0135	20	20	38,441	0,88	54	42	41,73	0.78	28
1971	5	19	20	42	12,0137	20	18	6,470	0,45	54	25	1,19	1,04	28
1971	5	19	20	42	14,0136	20	15	33,943	0.77	54	6	59.09	0,58	28
1971	5	19	20	42	16,0137	20	13	4,486	0,69	53	48	33.98	0,41	28
1971	5	19	20	42	18,0138	20	10	36,055	0.89	53	29	56.82	0,67	28
1971	6	5	19	32	7,9977	11	31	22,502	0,31	48	14	28,33	2,84	28
1971	6	5	19	32	9,9976	11	33	50,368	0.90	47	30	15.40	2,73	28
1971	11	6	13	6	20,9748	5	52	36,967	0.27	-63	58	50.98	1,04	29
1971	12	7	17	39	10,6282	1	17	36,825	0.37	43	46	21.26	0,98	28
1971	12	7	17	39	18,6322	1	17	16,700	0,47	40	45	43,94	2,01	28
1971	12	7	17	39	26,6323	1	17	0,251	0,61	37	45	59,09	1,22	28
1971	12	7	17	39	34,6323	1	16	47,169	0.36	34	47	26,39	1.08	28
1971	12	7	17	39	42,6322	1	16	36,136	0,28	31	50	59,24	1,74	28
1971	12	30	13	22	0,2517	8	48	51,595	0,95	34	21	7,15	2,90	30
1971	12	30	13	22	8,2508	8	45	35,211	0,38	36	56	39.10	0,75	30
1971	12	30	13	22	16,2499	8	42	2,721	1,03	39	30	42,68	0,51	30

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DATE						R.A.1950.0			RMS	DECL.1950.0			RMS	STATION
YEAR	MO	DA	HR	MIN	SEC	HR	MIN	SEC		DEG	MIN	SEC		
1971	10	17	18	19	43,9996	1	33	2,215	0.35	-54	31	57,75	1.10	40
1971	10	17	18	19	51,9995	1	30	50,236	0.38	-53	58	30,29	0,56	40
1971	10	17	18	19	59,9996	1	28	41.863	0,42	-53	24	36,32	1,54	40
1970	10	17	18	20	7,9996	1	26	36,235	0.34	-52	50	18,10	0,90	40
1971	10	17	18	20	15,9997	1	24	33.969	0.38	-52	15	33,21	0,84	40
1971	10	17	18	20	23,9997	1	22	34,889	0,30	-51	40	33,55	0,84	40
1971	10	17	10	20	31,9997	1	20	38,723	0,30	-51	5	6,27	0,99	40
1971	10	17	18	20	39,9998	1	18	45.560	0,29	-50	29	21,01	1.03	40
1971	10	17	18	20	48,0000	1	16	54.303	0,72	-49	52	53,69	2.37	40

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	7	15	16	38	32,0031	22	58	48,397	0,36	-42	10	44,58	1,18	29
1971	7	15	16	38	40,0001	2	36	52,756	0,62	-41	55	42,79	0,76	40
1971	7	15	16	38	48,0000	2	35	21,177	0,62	-41	26	13,66	1,00	40
1971	7	15	16	38	48,0029	22	59	38,375	0,42	-40	26	45,48	0,81	29
1971	7	15	16	38	55,9999	2	33	51,180	0,53	-40	56	32,49	1,33	40
1971	7	15	16	38	56,0028	23	0	2,122	0,39	-39	34	50,47	0,80	29
1971	7	15	16	38	56,0028	23	0	2,097	0,43	-39	34	50,36	0,96	29
1971	7	15	16	39	4,0001	2	32	23,012	0,54	-40	26	44,96	1,20	40
1971	7	15	16	39	4,0031	23	0	25,276	0,57	-38	43	2,27	0,74	29
1971	7	15	16	39	12,0031	23	0	47,755	0,53	-37	51	22,15	0,40	29
1971	7	15	16	39	12,1235	2	30	56,206	0,77	-39	56	41,81	0,32	40
1971	7	15	16	39	20,0002	2	29	30,908	0,35	-39	26	35,91	0,66	40
1971	7	15	16	39	20,0031	23	1	9,227	0,30	-36	59	47,99	0,90	29
1971	7	15	16	39	28,0003	2	28	7,258	0,59	-38	56	10,38	1,07	40
1971	7	15	16	39	28,0029	23	1	30,272	0,53	-36	8	20,20	0,66	29
1971	7	15	16	39	36,0008	2	26	45,274	0,77	-38	25	40,92	0,79	40
1971	7	15	16	39	36,0027	23	1	50,656	0,51	-35	17	5,34	0,56	29
1971	7	15	16	39	44,0010	2	25	24,813	0,59	-37	55	3,35	0,77	40
1971	7	19	17	31	27,9986	2	29	49,545	0,41	-69	0	48,04	0,30	40
1971	7	19	17	31	28,0058	20	38	9,602	0,38	-47	40	23,00	0,31	29
1971	7	19	17	31	35,9985	2	25	44,241	0,57	-68	31	36,12	0,85	40
1971	7	19	17	31	36,0058	20	40	26,743	0,23	-47	2	5,45	1,03	29
1971	7	19	17	31	43,9982	2	21	47,760	0,36	-68	1	49,92	0,82	40
1971	7	19	17	31	51,9986	2	18	1,496	0,64	-67	31	29,46	1,69	40
1971	7	19	17	31	52,0059	20	44	51,069	0,47	-45	44	46,75	0,61	29
1971	7	19	17	31	59,9984	2	14	22,740	0,65	-67	0	29,73	0,87	40
1971	7	19	17	32	0,0059	20	46	57,488	0,45	-45	5	47,31	0,86	29
1971	7	19	17	32	7,9985	2	10	52,598	0,75	-66	29	2,13	0,51	40
1971	7	19	17	32	15,9982	2	7	31,103	0,38	-65	57	2,49	0,44	40
1971	7	19	17	32	23,9983	2	4	16,808	0,59	-65	24	29,88	0,65	40
1971	7	19	17	32	31,9986	2	1	9,000	0,56	-64	51	23,35	0,81	40
1971	7	19	17	32	39,9982	1	58	8,307	0,44	-64	17	46,83	0,42	40
1971	10	12	10	23	27,9957	2	54	17,297	1,52	-62	11	58,99	1,03	40
1971	10	12	10	23	35,9956	2	50	53,297	0,75	-61	51	24,39	0,84	40
1971	10	12	10	23	43,9956	2	47	32,317	0,40	-61	30	13,07	0,97	40
1971	10	12	10	23	51,9955	2	44	15,141	0,58	-61	8	33,46	0,94	40
1971	10	12	10	23	59,9954	2	41	3,023	0,99	-60	46	28,79	0,92	40
1971	10	12	10	24	15,9957	2	34	48,238	0,52	-60	0	44,73	0,96	40
1971	10	12	10	24	23,9957	2	31	46,719	0,55	-59	37	11,78	0,63	40
1971	10	12	10	24	31,9958	2	28	48,759	0,52	-59	13	9,00	0,59	40
1971	10	12	10	24	39,9960	2	25	54,300	0,28	-58	48	29,77	0,78	40
1971	10	17	10	19	27,9997	1	37	35,973	0,49	-55	37	42,36	1,50	40
1971	10	17	10	19	35,9997	1	35	17,683	0,42	-55	5	5,73	0,82	40

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	3	8	15	30	23.9944	15	6	56.230	0.62	-33	37	26.23	0.50	40
1971	3	8	15	30	23.9986	11	43	55.133	0.36	-16	42	50.20	0.70	29
1971	3	8	15	30	31.9943	15	8	8.381	0.44	-34	19	1.53	0.74	40
1971	3	8	15	30	31.9990	11	43	24.102	0.20	-17	25	20.22	0.87	29
1971	3	8	15	30	39.9943	15	9	21.271	0.79	-35	0	34.24	0.37	40
1971	3	8	15	30	39.9992	11	42	52.137	0.35	-18	8	6.99	0.91	29
1971	3	8	15	30	47.9939	15	10	36.937	0.54	-35	41	57.40	0.76	40
1971	3	8	15	30	47.9993	11	42	19.717	0.43	-18	51	8.78	0.54	29
1971	3	8	15	30	55.9936	15	11	53.591	0.68	-36	23	15.03	0.40	40
1971	3	8	15	30	55.9996	11	41	46.533	0.38	-19	34	26.86	0.55	29
1971	3	8	15	31	3.9932	15	13	12.688	0.44	-37	4	22.36	0.69	40
1971	3	8	15	31	3.9998	11	41	12.163	0.30	-20	17	54.26	0.94	29
1971	3	8	15	31	11.9932	15	14	32.883	0.12	-37	45	18.92	0.64	40
1971	3	8	15	31	12.0000	11	40	37.942	0.18	-21	1	38.73	0.45	29
1971	3	8	15	31	19.9930	15	15	55.613	0.65	-38	26	16.68	1.41	40
1971	3	8	15	31	20.0004	11	40	1.203	0.12	-21	45	36.79	0.23	29
1971	3	8	15	31	27.9926	15	17	19.998	0.37	-39	6	59.84	0.60	40
1971	3	8	15	31	28.0005	11	39	24.653	0.46	-22	29	45.45	0.57	29
1971	3	8	15	31	35.9921	15	18	46.650	0.47	-39	47	31.00	1.49	40
1971	3	8	15	31	36.0008	11	38	46.685	0.44	-23	14	16.42	0.52	29
1971	6	29	18	0	47.9904	3	15	24.355	0.40	-51	10	10.97	0.95	40
1971	6	29	18	0	48.0020	22	31	28.258	0.60	-53	39	56.60	0.67	29
1971	6	29	18	0	55.9899	3	13	7.623	1.55	-50	43	1.20	0.71	40
1971	6	29	18	0	56.0020	22	32	44.287	0.59	-52	47	35.95	0.39	29
1971	6	29	18	1	3.9900	3	10	52.719	1.84	-50	15	36.05	0.49	40
1971	6	29	18	1	4.0020	22	33	57.716	0.97	-51	55	5.78	1.22	29
1971	6	29	18	1	11.9902	3	8	40.049	1.21	-49	47	59.70	1.31	40
1971	6	29	18	1	12.0023	22	35	8.296	0.43	-51	2	28.31	0.98	29
1971	6	29	18	1	19.9900	3	6	29.963	0.43	-49	19	49.63	0.65	40
1971	6	29	18	1	20.0021	22	36	15.986	0.27	-50	9	41.87	1.45	29
1971	6	29	18	1	27.9902	3	4	23.268	1.01	-48	51	27.35	0.72	40
1971	6	29	18	1	28.0021	22	37	21.188	0.23	-49	16	51.39	0.59	29
1971	6	29	18	1	35.9900	3	2	18.444	0.28	-48	22	44.40	2.05	40
1971	6	29	18	1	36.0021	22	38	23.995	0.33	-48	23	52.10	0.54	29
1971	6	29	18	1	43.9904	3	0	16.180	0.22	-47	53	40.32	0.75	40
1971	6	29	18	1	44.0018	22	39	24.089	0.33	-47	30	53.36	0.25	29
1971	6	29	18	1	51.9904	2	58	16.363	0.71	-47	24	27.00	0.60	40
1971	6	29	18	1	52.0018	22	40	22.142	0.46	-46	37	44.82	0.51	29
1971	6	29	18	1	59.9905	2	56	18.938	0.49	-46	54	47.12	0.72	40
1971	6	29	18	2	7.9907	2	54	23.724	0.53	-46	24	56.57	0.63	40
1971	7	15	16	38	23.9999	2	40	1.599	0.45	-42	53	59.63	0.98	40
1971	7	15	16	38	24.0028	22	58	22.232	0.23	-43	2	50.34	0.53	29
1971	7	15	16	38	32.0001	2	38	26.268	0.75	-42	24	55.06	0.80	40

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	27	14	57	4.0109	19	25	53.081	0.51	-52	29	3.04	0.57	29
1971	8	27	14	57	12.0100	19	27	44.400	0.58	-51	56	28.62	1.09	29

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	12	23	17	49	22.2214	4	16	1.742	0.32	0	49	22.65	0.88	29
970	0	3	17	49	30.2213	4	18	33.508	0.37	0	12	36.86	0.61	29
1971	12	23	17	49	38.2213	4	21	4.248	0.44	0	24	5.51	0.53	29
1971	12	24	18	53	56.4109	4	9	12.249	0.35	3	21	27.43	0.35	29
1971	12	24	18	54	4.4109	4	11	28.168	0.54	3	55	38.34	0.36	29
1971	12	27	2	40	53.0995	11	23	45.459	0.53	85	36	32.76	0.63	28
1971	12	27	2	41	1.0995	12	28	37.495	0.20	85	46	15.37	0.87	28
1971	12	27	2	41	17.0996	14	27	25.253	0.27	85	6	57.60	0.32	28

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	11	17	18	37	21,1356	19	24	42,845	0,67	30	49	19,37	0,57	28
1971	11	18	18	44	58,3611	0	22	2,347	0,72	-65	33	1,35	1,34	29
1971	11	18	18	45	16,3692	0	30	7,977	0,33	-69	55	1,37	1,41	29
1971	11	18	18	45	24,3695	0	33	28,926	0,58	-71	21	20,22	1,29	29
1971	11	18	16	38	42,4495	1	51	58,900	0,70	60	30	36,22	0.90	28
1971	11	18	16	38	50,4495	1	51	58,901	0,39	58	18	50,09	1,94	28
1971	11	18	16	38	58,4495	1	51	55,501	0,39	56	7	0,66	1,31	28
1971	11	18	16	39	6,4494	1	52	3,355	0,67	53	55	33,00	0,73	28
1971	11	18	16	39	14,4492	1	52	14,595	0,54	51	44	47,96	1,39	28
1971	11	21	6	57	1,2262	21	20	51,103	0,64	47	58	24,96	1,52	31
1971	11	25	11	39	54,1142	23	25	23,063	0,46	-66	21	46,32	1,08	29
1971	11	25	11	40	6,1146	23	30	3,725	0,41	-68	38	23,78	0,81	29
1971	12	1	18	47	6,3616	11	23	24,626	1,13	-73	16	21,65	0,77	29
1971	12	1	18	47	14,3615	11	22	34,099	0,21	-72	9	2,09	0,99	29
1971	12	1	18	47	22,3614	11	21	52,691	0,29	-71	1	52,48	0,60	29
1971	12	1	18	47	30,3617	11	21	19,047	0,29	-69	54	57,17	0.62	29
1971	12	1	18	47	38,3614	11	20	51,199	0,51	-68	48	10,50	0.97	29
1971	12	2	22	57	28,2877	13	21	44,139	1,32	85	28	23,50	0,96	31
1971	12	4	18	53	0,6490	13	29	19,475	2,19	-79	20	8,68	4,19	29
1971	12	4	18	53	8,6489	13	13	7,892	0,59	-78	35	19,63	0,71	29
1971	12	4	18	53	16,6490	12	59	2,011	1,50	-77	47	35,48	1,10	29
1971	12	4	18	53	24,6492	12	46	50,106	2,20	-76	57	31,35	0,82	29
1971	12	8	18	42	5,5537	10	38	52,874	0,72	-74	6	8,91	0,74	29
1971	12	8	18	41	54,5538	10	36	39,865	0,58	-72	58	33,22	0,81	29
1971	12	8	18	42	2,5536	10	34	46,853	0,47	-71	51	6,63	0,52	29
1971	12	8	18	42	10,5539	10	33	8,619	0,24	-70	43	49,56	0,46	29
1971	12	8	18	42	18,5539	10	31	44,827	0,22	-69	36	41,96	0,47	29
1971	12	12	15	6	17,7758	5	48	32,630	0,63	-23	0	32,88	0,54	29
1971	12	12	15	6	25,7753	5	52	28,994	0,37	-22	14	15,23	0,59	29
1971	12	12	15	6	33,7754	5	56	21,848	0,32	-21	27	30,87	0,83	29
1971	12	12	15	6	41,7756	6	0	10,897	0,48	-20	40	26,71	0,47	29
1971	12	12	15	6	49,7759	6	3	56,943	0,26	-19	53	2,26	0,86	29
1971	12	13	15	10	41,7148	5	35	3,078	0,49	-17	11	47,07	0,71	29
1971	12	13	15	10	49,7148	5	38	34,758	0,28	-16	28	14,33	1,10	29
1971	12	13	15	10	57,7149	5	42	3,462	0,59	-15	44	30,81	0,75	29
1971	12	13	15	11	5,7149	5	45	29,544	0,86	-15	0	33,41	0,92	29
1971	12	13	15	11	13,7152	5	48	53,206	0,59	-14	16	21,62	1,06	29
1971	12	17	8	56	50,0684	13	16	54,291	0,72	17	31	48,18	0,86	30
1971	12	20	9	7	17,2260	17	33	22,590	0,46	13	15	51,04	1,16	29
1971	12	23	8	52	14,2474	11	11	18,621	0,68	56	55	19,67	0.78	28
1971	12	23	8	52	22,2475	11	20	29,730	1,08	57	38	38,70	1,25	28
1971	12	23	18	49	6,2212	4	10	53,677	0,38	-2	2	45,78	1,08	29
1971	12	23	18	49	14,2211	4	13	28,314	0,64	-1	26	4,99	0,88	29

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A. 1950.0 HR	MIN	SEC	RMS	DECL. 1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	25	0	8	59.4152	13	26	25.710	0.55	-70	57	4.37	0.81	29
1971	8	25	0	9	7.4153	13	28	45.863	0.38	-71	59	45.89	1.27	29
1971	8	25	0	9	15.4152	13	31	20.305	0.61	-73	2	20.09	0.40	29
1971	8	25	0	9	23.4149	13	34	10.786	0.24	-74	4	43.91	0.43	29
1971	8	25	10	12	56.0871	12	56	26.789	0.48	-55	58	37.67	1.02	29
1971	8	25	10	13	12.0877	12	56	13.267	0.22	-57	28	47.78	0.69	29
1971	8	25	10	13	20.0876	12	56	3.530	0.46	-58	14	26.91	0.86	29
1971	8	25	10	13	28.0878	12	55	52.389	0.26	-59	0	30.94	0.86	29
1971	8	26	0	13	48.8566	12	57	39.005	0.42	-73	37	16.71	1.12	29
1971	8	26	0	13	51.8566	12	58	39.338	0.20	-74	38	30.52	0.48	29
1971	8	26	0	13	59.8567	12	59	44.696	0.70	-75	39	40.41	1.41	29
1971	8	26	0	14	7.8565	13	0	55.658	0.94	-76	40	49.94	1.03	29
1971	8	26	10	16	54.6306	12	55	55.807	0.34	-53	43	25.00	0.61	29
1971	8	26	10	17	2.6307	12	56	0.886	0.29	-54	25	45.28	0.67	29
1971	8	26	10	17	10.6302	12	56	4.229	0.80	-55	8	24.65	0.89	29
1971	8	26	10	17	18.6306	12	56	7.168	0.65	-55	51	29.24	0.80	29
1971	8	26	10	17	26.6303	12	56	8.507	0.50	-56	34	57.15	1.02	29
1971	8	26	10	23	36.1000	2	50	7.095	0.39	-82	54	44.48	1.09	29
1971	8	26	10	23	44.0999	2	41	6.764	0.95	-82	0	34.12	1.51	29
1971	8	26	10	23	52.0998	2	34	1.937	0.07	-81	5	49.42	1.62	29
1971	8	26	10	24	0.0994	2	28	21.581	0.20	-80	10	32.85	0.45	29
1971	8	26	10	24	8.0994	2	23	43.194	0.81	-79	14	55.41	0.72	29
1971	8	27	0	13	14.0213	12	23	29.238	0.41	-39	39	8.89	1.46	29
1971	8	27	0	13	22.0218	12	23	58.046	0.50	-40	26	29.78	0.78	29
1971	8	27	0	13	30.0217	12	24	19.382	0.21	-41	15	16.70	0.64	29
1971	8	27	0	13	38.0216	12	24	40.551	0.50	-42	4	32.14	0.37	29
1971	8	27	0	13	46.0214	12	25	0.986	0.31	-42	54	4.92	0.61	29
1971	8	27	0	18	44.8570	12	26	33.434	0.26	-77	54	58.90	1.43	29
1971	8	27	0	18	52.8569	12	25	17.415	0.11	-78	54	18.15	1.24	29
1971	8	27	0	19	0.8574	12	23	43.052	0.81	-79	53	29.53	1.28	29
1971	8	27	0	19	8.8571	12	21	44.181	0.67	-80	52	35.17	0.84	29
1971	8	27	0	19	16.8574	12	19	8.732	0.47	-81	51	22.70	1.21	29
1971	8	27	10	21	57.4180	12	58	44.383	0.32	-60	3	9.65	0.76	29
1971	8	27	10	22	5.4181	12	58	35.049	0.27	-59	18	56.32	0.29	29
1971	8	27	10	22	13.4182	12	58	26.001	0.23	-58	35	9.64	0.90	29
1971	8	27	10	22	21.4182	12	58	17.067	0.49	-57	51	49.51	0.66	29
1971	8	27	10	22	29.4182	12	58	6.261	0.49	-57	8	56.05	0.70	29
1971	8	29	0	22	58.6597	12	6	20.503	0.57	-46	47	46.58	0.73	29
1971	8	29	0	23	6.6598	12	6	26.386	0.21	-47	34	48.91	0.42	29
1971	8	29	0	23	14.6602	12	6	31.452	0.31	-48	22	10.73	1.06	29
1971	8	29	0	23	22.6598	12	6	35.624	0.43	-49	9	50.76	0.93	29
1971	8	29	0	23	30.6600	12	6	39.007	0.44	-49	58	2.99	0.73	29
1971	8	29	0	23	30.6601	12	6	39.131	0.44	-49	58	5.86	0.85	29

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	20	7	51	14.3594	22	4	13.221	0.75	-66	20	0.44	1.16	29
1971	8	20	7	51	22.3595	22	11	42.996	0.38	-65	55	23.74	1.56	29
1971	8	20	9	51	30.3598	22	18	51.961	0.49	-65	29	46.39	1.56	29
1971	8	20	7	51	38.3592	22	25	40.945	0.34	-65	3	27.08	1.10	29
1971	8	20	9	52	19.6293	13	32	8.476	0.25	-65	7	23.43	0.21	29
1971	8	20	9	52	27.6296	13	32	3.152	0.11	-66	4	43.70	0.60	29
1971	8	20	9	52	35.6295	13	31	55.401	0.19	-67	2	11.71	0.56	29
1971	8	20	9	52	43.6297	13	31	44.580	0.38	-67	59	54.16	0.83	29
1971	8	20	9	52	51.6301	13	31	30.246	0.17	-68	57	49.75	0.50	29
1971	8	20	9	57	7.3464	2	29	57.423	0.51	-80	22	40.73	0.47	29
1971	8	20	9	57	15.5467	2	27	40.544	0.50	-79	29	10.21	0.54	29
1971	8	20	9	57	23.5465	2	25	48.103	0.36	-78	35	59.47	0.69	29
1971	8	20	11	58	2.5798	14	5	58.366	0.22	-61	16	44.88	0.79	29
1971	8	20	11	58	10.5796	14	6	9.156	0.53	-62	1	32.29	1.28	29
1971	8	20	11	58	18.5801	14	6	18.690	0.24	-62	46	37.58	0.70	29
1971	8	20	11	58	26.5797	14	6	27.428	0.51	-63	32	7.46	1.77	29
1971	8	20	11	58	34.5799	14	6	35.677	0.59	-64	18	9.74	0.25	29
1971	8	21	7	44	42.7423	13	44	3.830	0.45	-13	40	13.47	0.61	29
1971	8	21	7	45	0.7418	13	45	23.142	0.30	-14	31	8.41	0.78	29
1971	8	21	7	45	8.7417	13	46	43.499	0.18	-15	22	40.66	0.69	29
1971	8	21	7	45	16.7418	13	48	5.094	0.15	-16	14	58.86	0.65	29
1971	8	21	7	45	24.7420	13	49	28.219	0.36	-17	7	50.47	0.99	29
1971	8	21	7	49	52.3714	15	9	51.818	0.18	-53	35	29.90	0.98	29
1971	8	21	7	50	0.3719	15	14	7.188	0.32	-54	41	35.31	0.91	29
1971	8	21	7	50	8.3718	15	18	37.070	0.61	-55	47	10.20	1.43	29
1971	8	21	7	50	16.3723	15	23	20.482	0.35	-56	51	59.09	0.55	29
1971	8	21	7	50	24.3718	15	28	19.784	0.51	-57	56	10.43	1.20	29
1971	8	21	9	57	51.7135	13	10	25.285	0.26	-72	53	25.66	0.55	29
1971	8	21	9	57	59.7132	13	8	55.011	0.49	-73	49	50.99	0.92	29
1971	8	21	9	58	7.7133	13	7	9.884	0.43	-74	46	22.53	0.88	29
1971	8	21	9	58	15.7134	13	5	7.195	0.29	-75	42	52.38	1.12	29
1971	8	21	9	58	23.7130	13	2	43.902	0.43	-76	39	18.93	1.03	29
1971	8	21	10	2	29.8112	2	31	2.555	0.44	-74	18	8.45	0.73	29
1971	8	21	10	2	37.8114	2	29	34.884	0.58	-73	26	47.67	0.39	29
1971	8	21	10	2	45.8114	2	28	18.721	0.39	-72	35	47.64	0.58	29
1971	8	21	10	2	53.8115	2	27	12.233	0.39	-71	45	3.13	0.63	29
1971	8	21	10	3	1.8115	2	26	14.582	0.37	-70	54	43.86	1.17	29
1971	8	21	12	2	59.2740	14	14	16.743	0.28	-64	2	53.59	0.79	29
1971	8	21	12	3	7.2740	14	14	50.394	0.65	-64	48	16.62	0.62	29
1971	8	21	12	3	15.2743	14	15	24.545	0.38	-65	34	8.31	1.06	29
1971	8	21	12	3	23.2745	14	15	59.547	0.18	-66	20	21.38	0.46	29
1971	8	21	12	3	31.2740	14	16	35.529	0.31	-67	7	8.78	0.61	29
1971	8	25	8	8	51.4151	13	24	16.135	0.35	-69	54	16.59	1.14	29

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1971	8	29	10	32	4,1830	13	15	41,703	0,36	-63	49	21,15	1.05	29
1971	8	29	10	32	12,1829	13	16	37,482	0,21	-64	34	7,26	0.38	29
1971	8	29	10	32	20,1831	13	17	35,651	0.36	-65	19	22,40	0.71	29
1971	8	29	10	32	28,1833	13	18	35,619	0,44	-66	4	59,42	0.84	29
1971	8	29	10	32	36,1828	13	19	39,079	0.27	-66	51	10,07	0.80	29
1971	8	29	10	35	56,4245	17	6	22,968	0,42	-87	39	31,54	0.46	29
1971	8	29	10	36	20,4241	21	53	11,086	0,75	-87	21	52,91	0.75	29
1971	8	30	8	28	1,1357	11	59	33,193	0.23	-50	56	50,24	0.41	29
1971	8	30	8	28	17,1360	11	59	31,331	1,11	-51	43	37,97	0.52	29
1971	8	30	8	28	17,1360	11	59	27,940	0.29	-52	30	50,61	0.44	29
1971	8	30	8	28	25,1360	11	59	23,465	0.20	-53	18	28,58	0.68	29
1971	8	30	8	28	33,1359	11	59	17,649	0,41	-54	6	29,33	0.81	29
1971	8	30	10	36	18,3485	13	25	47,844	0.25	-62	26	32.67	0.70	29
1971	8	30	10	36	26,3487	13	27	11,736	0,36	-63	9	14.04	0.82	29
1971	8	30	10	36	34,3483	13	28	39,410	0.41	-63	52	18,88	1.85	29
1971	8	30	10	36	42,3484	13	30	11,654	0,55	-64	35	56.12	0.67	29
1971	8	30	10	36	50,3484	13	31	48,821	0,57	-65	19	56.18	0.74	29
1971	8	31	15	24	4,1540	21	46	55,344	0.57	54	17	25,26	0.87	31
1971	9	4	10	13	4,0878	12	56	20.648	0.31	-56	43	26,77	0.72	29
1971	10	29	13	54	13,3908	7	38	28,441	0.68	0	21	55,81	0.80	29
1971	10	29	13	54	21,3913	7	41	32,761	0,77	-1	7	46,82	0.69	29
1971	10	29	13	54	29,3910	7	44	37,871	1.49	-1	53	27,62	1.98	29
1971	10	29	13	54	37,3911	7	47	44,120	1,19	-2	38	35,23	2.02	29
1971	10	29	13	54	46,3909	7	50	50.299	0.82	-3	23	20.14	0.94	29
1971	11	2	14	11	16,4161	6	52	43,634	0.35	-20	20	47,97	1,07	29
1971	11	2	14	11	24,4159	6	57	51,230	0.44	-21	19	33.11	1.24	29
1971	11	2	14	11	32,4164	7	3	0,607	1,00	-22	16	54,47	0.57	29
1971	11	2	14	11	40,4162	7	8	12,943	1.33	-23	12	51.27	1.69	29
1971	11	2	14	11	48,4160	7	13	27,563	0.37	-24	7	24.06	0.53	29
1971	11	7	12	29	50,3684	7	21	4,641	0.43	-18	49	58,31	0.75	29
1971	11	7	12	29	58,3683	7	25	3,636	0.59	-19	28	35,14	1.04	29
1971	11	7	12	30	6,3682	7	29	1,477	0,48	-20	6	3,30	0.76	29
1971	11	7	12	30	14,3681	7	32	59,800	0.35	-20	42	25,79	0.36	29
1971	11	7	12	30	22,3681	7	36	57,398	0.37	-21	17	49,87	0.54	29
1971	11	9	12	37	46,3759	6	52	29,684	0,26	-27	31	38,07	0.42	29
1971	11	9	12	37	54,3764	6	57	44,598	0.32	-28	13	43,51	0.62	29
1971	11	9	12	38	2,3764	7	2	59,336	0.39	-28	54	9,59	0.33	29
1971	11	9	12	38	10,3764	7	8	13,726	0.39	-29	32	56,17	0.73	29
1971	11	9	12	38	18,3764	7	13	27,351	0.39	-30	10	0,20	1.13	29
1971	11	17	18	37	5,1316	19	9	33,184	0.86	32	24	10,49	1.52	28
1971	11	17	18	37	9,1307	19	13	19,325	0.62	32	1	46.29	0.92	28
1971	11	17	18	37	13,1353	19	17	5,287	1.00	31	38	33,35	1.00	28
1971	11	17	18	37	17,1355	19	20	53,488	1.29	31	14	23,48	0.60	28

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1971	8	13	10	23	41,5753	14	29	14,530	0,48	-39	48	53,33	0,65	29
1971	8	13	10	23	49,5752	14	29	32,865	0,53	-40	34	20,92	1,18	29
1971	8	13	10	26	31,6303	14	33	41,821	0,33	-57	31	37,87	1,17	29
1971	8	13	10	26	40,6302	14	33	45,389	0,35	-58	25	36,68	0,76	29
1971	8	13	10	26	48,6298	14	33	47,531	0,20	-59	19	52,67	0,26	29
1971	8	13	10	26	56,6301	14	33	48,284	0,13	-60	14	24,19	0,23	29
1971	8	13	10	27	4,6298	14	33	47,166	0,40	-61	9	16,68	0,71	29
1971	8	15	9	29	56,5114	21	26	39,105	1,07	-44	17	14,76	1,12	29
1971	8	15	9	30	12,5116	21	35	29,643	0,48	-44	25	44,33	0,75	29
1971	8	15	10	33	13,3238	14	13	45,196	0,42	-45	17	53,84	0,79	29
1971	8	15	10	33	21,3238	14	13	51,401	0,38	-46	1	41,14	0,45	29
1971	8	15	10	33	37,3237	14	14	2,226	0,45	-47	30	29,53	0,57	29
1971	8	15	10	33	45,3231	14	14	6,163	0,80	-48	15	24,92	1,11	29
1971	8	18	10	48	24,5318	14	1	49,002	0,28	-56	52	28,02	1,29	29
1971	8	18	10	48	32,5316	14	1	43,306	0,29	-57	37	2,83	0,56	29
1971	8	18	10	48	40,5315	14	1	35,356	0,33	-58	22	5,19	1,30	29
1971	8	18	10	48	56,5318	14	1	14,809	0,30	-59	53	16,51	0,61	29
1971	8	18	10	48	48,5317	14	1	26,305	0,42	-59	7	28,72	0,68	29
1971	8	19	9	41	0,8377	16	5	59,806	1,03	-43	11	52,14	1,76	29
1971	8	19	9	41	8,8380	16	10	32,338	1,06	-44	16	1,81	0,84	29
1971	8	19	9	41	16,8382	16	15	14,563	1,19	-45	19	28,52	1,06	29
1971	8	19	9	41	24,8386	16	20	7,460	0,74	-46	22	10,30	1,71	29
1971	8	19	9	41	32,8386	16	25	11,164	0,89	-47	24	2,78	1,01	29
1971	8	19	9	46	5,1781	21	2	17,270	0,20	-63	49	9,00	0,51	29
1971	8	19	9	46	13,1781	21	10	37,693	0,54	-63	39	11,90	0,29	29
1971	8	19	9	46	21,1782	21	18	43,946	0,55	-63	27	42,20	0,69	29
1971	8	19	9	46	37,1782	21	34	14,731	0,28	-63	0	25,60	0,93	29
1971	8	19	9	56	29,1780	21	26	36,909	1,24	-63	14	45,65	0,96	29
1971	8	19	9	53	31,3809	2	4	28,368	0,32	-74	32	20,72	1,23	29
1971	8	19	9	53	39,3806	2	4	59,776	0,38	-73	41	26,52	1,33	29
1971	8	19	9	53	55,3809	2	5	54,300	2,47	-72	0	58,47	0,90	29
1971	8	19	9	54	3,2972	2	6	29,189	0,21	-71	11	18,48	1,38	29
1971	8	19	9	54	3,3811	2	5	30,169	0,45	-72	50	53,55	0,90	29
1971	8	20	9	57	31,5464	2	24	15,263	0,20	-77	43	4,10	0,91	29
1971	8	19	10	53	9,4879	14	2	17,201	0,46	-58	44	54,37	0,93	29
1971	8	19	10	53	17,4881	14	2	16,847	0,22	-59	29	17,09	0,44	29
1971	8	19	10	53	25,4880	14	2	15,066	0,30	-60	14	1,22	0,57	29
1971	8	19	10	53	33,4879	14	2	11,614	0,57	-60	59	11,44	0,67	29
1971	8	20	9	47	9,4905	16	50	47,452	0,24	-61	2	44,62	0,55	29
1971	8	20	9	47	25,4913	17	6	51,639	0,54	-62	40	36,16	0,81	29
1971	8	20	9	47	33,4913	17	15	26,294	0,56	-63	26	21,04	1,20	29
1971	8	20	9	47	41,4915	17	24	23,763	0,41	-64	9	47,38	1,45	29
1971	8	20	9	51	6,3589	21	56	23,639	1,02	-66	43	40,59	0,86	29

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1971	7	31	16	49	39,7568	17	43	1,682	0,53	-67	26	28,83	0.64	29
1971	7	31	16	54	4,7586	4	40	30,845	0,40	-81	44	5,75	0,75	29
1971	7	31	16	54	12,7588	4	47	15,116	0,42	-80	43	3,52	0,99	29
1971	7	31	16	54	20,7592	4	52	45,318	0,46	-79	41	22,96	0,20	29
1971	8	5	11	33	29,3234	14	13	57,112	0,26	-46	45	51,30	0,36	29
1971	8	10	13	29	47,0676	4	21	55,980	0,51	-53	32	53,82	0,51	29
1971	8	10	13	29	55,0675	4	21	51,198	0,52	-52	44	57,32	0,52	29
1971	8	10	13	30	3,0673	4	21	47,645	0,53	-51	57	25,32	0,65	29
1971	8	10	13	30	11,0672	4	21	45,382	0,30	-51	10	8,77	0,65	29
1971	8	10	13	30	19,0669	4	21	44,316	0,20	-50	23	24,41	0,44	29
1971	8	10	15	32	12,7586	1	1	53,203	0,25	-76	9	10,13	0,44	29
1971	8	10	15	32	20,7589	1	15	5,657	0,36	-75	21	55,86	0,64	29
1971	8	10	15	32	28,7596	1	27	2,469	0,60	-74	32	4,03	0,66	29
1971	8	10	15	32	36,7592	1	37	54,045	0,41	-73	39	41,16	0,49	29
1971	8	10	15	32	44,7592	1	47	45,093	0,28	-72	45	13,54	0,67	29
1971	8	11	7	2	37,2216	17	45	36,574	0,37	17	37	24,39	0,51	29
1971	8	11	7	2	45,2216	17	47	43,546	0,26	16	59	14,79	0,45	29
1971	8	11	7	2	53,2215	17	49	51,207	0,73	16	20	58,12	0,76	29
1971	8	11	7	3	1,2213	17	51	59,543	0,46	15	42	23,18	0,64	29
1971	8	11	7	11	30,6196	20	41	42,040	0,29	-23	29	44,59	0,34	29
1971	8	11	7	11	38,6196	20	44	44,846	0,52	-23	54	12,91	0,66	29
1971	8	11	7	11	46,6197	20	47	47,540	0,38	-24	18	5,20	0,67	29
1971	8	11	7	11	54,6196	20	50	50,662	0,62	-24	41	23,28	0,91	29
1971	8	11	7	12	2,6194	20	53	53,552	0,56	-25	4	3,19	0,38	29
1971	8	11	9	7	42,6132	15	58	16,806	0,36	-7	51	7,42	0,59	29
1971	8	11	9	7	50,6129	16	0	18,451	0,24	-8	44	12,30	0,93	29
1971	8	11	9	7	58,6134	16	2	22,422	0,30	-9	37	59,57	1,22	29
1971	8	11	9	8	6,6133	16	4	28,761	0,77	-10	32	26,57	0,89	29
1971	8	11	9	8	14,6134	16	6	37,880	0,32	-11	27	35,88	0,82	29
1971	8	11	9	8	22,6044	16	8	49,437	0,56	-12	23	28,54	1,01	29
1971	8	11	9	13	22,4672	18	29	7,769	0,53	-50	5	5,86	0,91	29
1971	8	11	9	13	30,4675	18	35	22,625	0,57	-50	54	27,35	0,51	29
1971	8	11	9	13	38,4674	18	41	47,989	0,69	-51	42	13,29	0,40	29
1971	8	11	9	13	46,4674	18	48	23,939	1,45	-52	28	10,13	0,63	29
1971	8	11	11	15	1,3146	14	53	11,534	0,17	-38	20	9,90	0,63	29
1971	8	11	11	15	9,3146	14	53	45,574	0,30	-39	10	29,87	0,49	29
1971	8	11	11	15	17,3145	14	54	19,451	0,36	-40	1	19,17	0,52	29
1971	8	11	11	15	25,3145	14	54	54,153	0,35	-40	52	36,36	0,57	29
1971	8	11	11	15	33,3143	14	55	28,899	0,44	-41	44	24,64	0,70	29
1971	8	11	13	33	57,2339	4	14	6,704	0,28	-54	46	10,64	0,85	29
1971	8	11	13	34	5,2341	4	14	3,762	0,29	-53	55	32,74	1,61	29
1971	8	11	13	34	13,2340	4	14	2,114	0,32	-53	5	19,86	1,12	29
1971	8	11	13	34	21,2341	4	14	1,249	0,44	-52	15	27,34	0,89	29

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1971	7	24	18	24	49.0229	18	49	52.355	0.32	-66	14	57.25	1.26	29
1971	7	24	18	25	5.0230	18	52	24.275	0.47	-67	47	6.72	0.87	29
1971	7	24	18	25	13.0230	18	53	46.394	0.23	-68	33	56.18	0.78	29
1971	7	24	18	25	21.0233	18	55	13.487	0.45	-69	21	20.85	0.53	29
1971	7	24	18	35	24.4860	6	52	2.769	0.14	-34	34	32.15	0.64	29
1971	7	24	18	35	32.4862	6	52	42.836	0.31	-33	40	22.94	1.13	29
1971	7	24	18	35	40.4864	6	53	22.406	0.22	-32	46	50.46	0.69	29
1971	7	24	18	35	48.4866	6	54	1.839	0.37	-31	53	52.39	0.72	29
1971	7	27	7	52	30.8403	18	12	52.918	0.29	12	56	48.35	1.99	31
1971	7	27	7	52	58.8395	18	22	29.446	0.30	7	16	22.83	0.33	31
1971	7	27	7	53	2.8394	18	23	48.296	0.23	6	29	22.70	0.75	31
1971	7	27	7	53	6.8393	18	25	6.197	0.49	5	42	52.29	0.68	31
1971	7	28	14	36	36.7119	5	27	23.021	0.32	-65	15	11.30	1.32	29
1971	7	28	14	36	44.7116	5	27	51.726	0.33	-64	28	41.42	1.00	29
1971	7	28	14	36	52.7118	5	28	19.395	0.21	-63	42	41.49	1.74	29
1971	7	28	14	37	0.7116	5	28	46.716	0.46	-62	57	11.69	0.54	29
1971	7	28	14	37	8.7116	5	29	14.093	0.19	-62	12	1.99	0.96	29
1971	7	28	16	37	39.2297	17	0	43.077	0.26	-76	17	35.68	0.70	29
1971	7	28	16	37	47.2299	16	58	2.058	0.45	-77	9	49.06	0.55	29
1971	7	28	18	41	46.0413	19	43	55.226	0.38	-58	55	47.24	1.00	29
1971	7	28	18	41	54.0414	19	47	1.894	0.26	-59	29	18.82	0.93	29
1971	7	28	18	42	2.0410	19	50	17.990	0.98	-60	2	58.03	0.83	29
1971	7	28	18	42	10.0410	19	53	42.574	0.93	-60	36	49.75	1.28	29
1971	7	29	14	41	9.4956	5	35	33.132	0.45	-64	40	42.95	0.41	29
1971	7	29	14	41	9.4956	5	35	33.131	0.45	-64	40	43.12	0.41	29
1971	7	29	14	41	17.4955	5	35	35.630	0.21	-63	53	35.88	0.79	29
1971	7	29	14	41	25.4958	5	35	39.969	0.63	-63	7	4.90	0.87	29
1971	7	29	14	41	33.4956	5	35	43.524	0.30	-62	20	54.08	0.46	29
1971	7	29	14	41	41.4958	5	35	49.092	0.26	-61	35	1.36	0.68	29
1971	7	31	8	10	49.9066	15	30	51.217	1.18	-23	47	9.11	1.71	31
1971	7	31	8	10	53.9066	15	32	18.568	0.79	-24	19	8.27	0.55	31
1971	7	31	8	10	57.9066	15	33	45.971	0.51	-24	51	4.18	0.79	31
1971	7	31	8	11	1.9066	15	35	12.906	0.24	-25	22	38.88	1.29	31
1971	7	31	8	11	5.9067	15	36	39.701	0.75	-25	54	5.04	1.05	31
1971	7	31	14	49	35.4476	5	44	52.689	0.36	-67	24	45.47	0.73	29
1971	7	31	14	49	43.4476	5	44	4.541	0.32	-66	34	35.16	0.88	29
1971	7	31	14	49	51.4478	5	43	21.875	0.28	-65	44	46.93	0.74	29
1971	7	31	14	49	59.4477	5	42	43.492	0.26	-64	55	17.33	0.39	29
1971	7	31	14	50	7.4476	5	42	9.679	0.31	-64	6	10.28	0.75	29
1971	7	31	16	49	7.7561	17	38	55.550	0.69	-64	24	49.73	0.88	29
1971	7	31	16	49	15.7563	17	39	53.147	0.90	-65	9	31.49	0.82	29
1971	7	31	16	49	23.7564	17	40	52.966	0.47	-65	54	39.96	0.61	29
1971	7	31	16	49	31.7565	17	41	55.587	0.37	-66	40	18.27	0.62	29

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1971	7	21	9	26	36.0992	14	45	18.832	0.46	54	21	20.58	0.83	31
1971	7	21	9	26	44.0980	14	52	13.660	0.54	53	43	38.33	1.45	31
1971	7	21	9	26	52.0994	14	59	5.353	0.45	53	3	29.07	0.72	31
1971	7	21	9	27	0.0995	15	5	53.330	0.94	52	20	52.32	0.57	31
1971	7	21	16	7	30.6789	18	3	5.673	0.66	-85	0	51.81	1.47	29
1971	7	21	16	7	38.6710	17	59	19.616	0.44	-85	59	18.92	0.99	29
1971	7	21	16	7	46.6710	17	52	50.277	0.36	-86	57	22.61	0.51	29
1971	7	21	16	7	54.6711	17	40	4.978	0.34	-87	54	59.84	0.47	29
1971	7	21	16	8	2.6714	17	5	24.641	0.28	-88	51	21.25	0.66	29
1971	7	21	18	9	47.9865	18	22	51.730	0.43	-57	14	5.47	0.55	29
1971	7	21	18	9	55.9864	18	22	50.737	0.30	-57	56	52.78	0.67	29
1971	7	21	18	10	3.9865	18	22	47.937	0.38	-58	40	3.18	0.63	29
1971	7	21	18	10	11.9867	18	22	44.068	0.36	-59	23	38.16	1.08	29
1971	7	21	18	10	19.9865	18	22	38.551	0.53	-60	7	42.88	0.95	29
1971	7	21	19	26	4.0444	18	39	19.988	1.72	2	4	17.29	1.95	28
1971	7	21	19	26	8.0443	18	40	24.500	1.12	1	31	29.68	1.88	28
1971	7	21	19	26	12.0442	18	41	29.356	2.07	0	58	55.88	4.01	28
1971	7	21	19	26	16.0442	18	42	32.564	1.30	0	26	53.04	2.14	28
1971	7	21	19	26	20.0438	18	43	34.918	0.29	0	4	26.11	2.02	28
1971	7	21	19	26	28.0430	18	45	36.441	1.08	-1	5	58.64	2.49	28
1971	7	21	19	26	32.0273	18	46	36.083	0.71	-1	35	56.75	2.34	28
1971	7	21	19	26	34.0132	18	47	35.009	1.03	-2	5	27.35	2.10	28
1971	7	23	16	16	33.0265	15	58	2.277	0.26	-84	49	32.27	1.06	29
1971	7	23	16	16	41.0265	15	31	11.900	0.89	-85	35	37.04	2.20	29
1971	7	23	16	16	49.0264	14	53	42.828	0.44	-86	16	26.80	1.17	29
1971	7	23	16	16	57.0263	14	1	41.894	0.43	-86	48	36.24	0.96	29
1971	7	23	16	17	5.0261	12	53	47.034	0.60	-87	7	21.10	0.82	29
1971	7	23	16	21	13.9989	6	47	21.306	0.18	-62	38	33.90	1.44	29
1971	7	23	16	21	21.9989	6	47	3.717	0.24	-61	50	40.19	0.84	29
1971	7	23	16	21	29.9989	6	46	47.508	0.28	-61	3	15.45	0.26	29
1971	7	23	16	21	37.9986	6	46	34.648	0.39	-60	16	10.19	1.95	29
1971	7	23	16	21	45.9986	6	46	23.257	0.26	-59	29	29.84	0.45	29
1971	7	23	18	19	14.5824	18	32	42.881	0.23	-60	15	10.84	0.37	29
1971	7	23	18	19	30.5826	18	33	40.379	0.23	-61	40	54.90	0.79	29
1971	7	23	18	19	38.5826	18	34	8.613	0.28	-62	24	32.61	1.28	29
1971	7	23	18	19	46.5822	18	34	37.229	0.50	-63	8	38.77	0.54	29
1971	7	23	18	24	30.3603	6	28	6.618	0.34	-85	17	59.17	0.30	29
1971	7	23	18	24	38.3602	6	31	43.734	0.34	-84	16	35.85	1.30	29
1971	7	23	18	24	46.3600	6	34	24.353	0.31	-83	14	49.12	1.36	29
1971	7	23	18	24	54.3599	6	36	28.963	0.63	-82	12	48.79	1.00	29
1971	7	23	18	25	2.3596	6	38	11.187	0.44	-81	10	26.42	0.78	29
1971	7	24	9	39	34.8058	13	59	35.008	1.00	26	8	50.66	1.91	31
1971	7	24	9	40	22.8073	14	20	4.723	0.92	21	7	29.20	1.03	31

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1971	7	17	17	51	33.1727	18	33	53.164	0.43	-53	38	45.94	1.05	29
1971	7	17	17	51	41.1724	18	33	43.890	0.49	-54	25	21.37	0.46	29
1971	7	17	17	51	49.1725	18	33	32.704	0.30	-55	12	20.83	0.70	29
1971	7	17	17	51	57.1725	18	33	19.855	0.56	-55	59	39.21	1.25	29
1971	7	17	17	56	13.0025	16	50	21.998	0.54	-83	22	42.42	0.84	29
1971	7	17	17	56	21.0023	16	29	25.832	0.74	-84	7	58.25	1.22	29
1971	7	17	17	56	29.0025	16	2	26.624	0.46	-84	49	11.56	0.78	29
1971	7	18	9	14	21.5964	19	0	50.827	0.46	71	50	47.55	0.65	31
1971	7	18	9	14	29.5962	19	7	0.683	0.51	70	41	49.53	0.66	31
1971	7	18	9	14	37.5963	19	12	39.549	0.44	69	31	6.84	0.73	31
1971	7	18	9	14	45.5962	19	17	50.961	0.47	68	18	32.00	0.84	31
1971	7	18	9	14	53.5959	19	22	39.699	0.53	67	4	21.71	1.57	31
1971	7	18	15	56	33.4789	4	57	39.415	1.05	-76	8	6.30	1.66	29
1971	7	18	15	56	41.4788	5	4	34.524	0.20	-75	21	17.65	0.74	29
1971	7	18	15	56	49.4788	5	10	45.825	0.22	-74	34	30.69	1.03	29
1971	7	18	15	56	57.4790	5	16	21.943	0.26	-73	47	34.28	0.46	29
1971	7	18	15	57	5.4791	5	21	25.976	0.37	-73	0	42.20	0.91	29
1971	7	18	17	55	51.2673	18	28	11.655	0.29	-53	12	1.90	0.98	29
1971	7	18	17	55	59.2678	18	28	2.789	0.31	-53	56	39.98	1.07	29
1971	7	18	17	56	7.2678	18	27	52.875	0.25	-54	41	40.29	0.80	29
1971	7	18	17	56	15.2679	18	27	39.670	0.40	-55	27	2.06	1.21	29
1971	7	18	17	56	23.2678	18	27	25.259	0.50	-56	12	47.05	0.74	29
1971	7	18	17	56	31.2677	18	27	8.636	0.36	-56	59	1.36	0.61	29
1971	7	18	18	0	53.6607	16	7	42.622	0.28	-84	17	40.64	0.84	29
1971	7	18	18	1	1.6609	15	37	49.209	0.72	-84	55	24.46	1.01	29
1971	7	18	18	1	17.6607	14	14	27.003	0.70	-85	48	21.90	0.42	29
1971	7	18	18	1	25.6604	13	22	25.252	0.57	-85	58	22.86	0.76	29
1971	7	18	18	1	25.6604	13	22	24.582	0.52	-85	58	22.46	0.62	29
1971	7	18	21	14	16.0003	15	22	40.800	0.37	11	51	48.57	0.76	28
1971	7	18	21	14	23.9995	15	28	0.030	1.21	10	47	10.45	1.83	28
1971	7	19	9	18	37.1190	17	15	27.559	0.45	68	19	9.63	0.28	31
1971	7	19	9	18	41.2290	17	20	5.810	0.50	67	50	31.65	1.13	31
1971	7	20	18	8	39.6598	17	53	48.439	0.23	-77	5	47.26	0.70	29
1971	7	20	18	8	47.6596	17	49	38.126	0.52	-77	58	1.60	0.78	29
1971	7	20	18	8	55.6595	17	44	42.679	0.43	-78	50	12.81	0.98	29
1971	7	20	18	9	3.6594	17	38	51.569	0.37	-79	42	18.30	0.89	29
1971	7	20	18	9	11.6592	17	31	48.497	0.16	-80	34	10.05	1.00	29
1971	7	20	18	9	19.6590	17	23	13.559	0.42	-81	25	38.28	1.21	29
1971	7	20	18	13	19.0262	7	44	33.839	0.93	-68	43	4.55	1.03	29
1971	7	20	18	13	27.0263	7	43	28.600	0.27	-67	46	24.94	0.66	29
1971	7	20	18	13	35.0262	7	42	16.280	0.74	-66	49	53.72	0.66	29
1971	7	20	18	13	43.0262	7	41	19.643	0.19	-65	53	31.52	0.61	29
1971	7	21	9	26	28.0992	14	38	21.327	0.66	54	56	42.20	0.81	31

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1971	8	11	15	34	29.2338	4	14	2.568	0.34	-51	25	58.79	1.32	29
1971	8	11	15	42	47.3021	3	39	6.967	0.46	-24	49	44.50	0.36	29
1971	8	11	15	42	55.3017	3	40	34.899	0.44	-23	51	55.49	0.49	29
1971	8	11	15	43	3.3022	3	42	0.875	0.53	-22	54	48.24	1.02	29
1971	8	11	15	43	11.3018	3	43	25.224	0.34	-21	58	22.87	0.45	29
1971	8	11	15	43	19.3019	3	44	47.864	0.42	-21	2	38.40	2.02	29
1971	8	11	17	38	9.4495	20	50	2.191	0.54	-40	33	38.43	1.18	29
1971	8	11	17	38	17.4497	20	53	59.521	0.48	-40	27	37.68	0.51	29
1971	8	11	17	38	25.4498	20	57	59.069	0.32	-40	20	52.09	0.95	29
1971	8	11	17	38	33.4381	21	2	1.020	0.42	-40	13	25.20	0.41	29
1971	8	11	17	38	41.4498	21	6	5.051	0.63	-40	5	7.28	0.50	29
1971	8	11	17	42	2.6501	23	27	33.086	0.45	-26	33	50.02	0.64	29
1971	8	11	17	42	10.6501	23	31	43.312	0.45	-25	51	25.44	0.63	29
1971	8	11	17	42	38.6490	23	14	51.387	0.31	-28	35	16.58	0.46	29
1971	8	11	17	42	46.6496	23	19	6.892	0.29	-27	55	45.55	0.76	29
1971	8	11	17	42	54.6502	23	23	20.958	0.38	-27	15	15.42	0.60	29
1971	8	12	7	6	45.2257	17	24	22.184	0.43	15	57	41.37	1.20	29
1971	8	12	7	6	53.2259	17	26	36.146	0.91	15	17	44.74	1.49	29
1971	8	12	7	7	1.2261	17	28	51.096	0.55	14	37	26.62	1.60	29
1971	8	12	7	7	9.2263	17	31	7.036	0.68	13	56	46.69	1.41	29
1971	8	12	7	11	17.4359	18	52	3.153	0.55	-8	27	5.60	0.68	29
1971	8	12	7	11	25.4361	18	55	1.203	0.39	-9	9	48.96	0.38	29
1971	8	12	7	11	33.5357	18	58	0.404	0.40	-9	52	11.69	0.72	29
1971	8	12	7	11	41.6359	19	1	0.909	0.54	-10	34	17.05	0.64	29
1971	8	12	7	11	49.4359	19	4	2.578	0.70	-11	15	55.50	0.44	29
1971	8	12	9	11	30.4020	15	27	10.580	0.41	-8	26	7.68	0.80	29
1971	8	12	9	11	38.4025	15	28	51.914	0.25	-9	17	3.81	0.98	29
1971	8	12	9	11	46.4025	15	30	34.489	0.41	-10	8	40.42	2.10	29
1971	8	12	9	11	54.4024	15	32	19.152	0.27	-11	1	0.88	0.81	29
1971	8	12	9	12	2.4027	15	34	5.863	0.49	-11	54	2.67	0.65	29
1971	8	13	7	10	24.3778	16	55	37.459	0.54	15	34	48.58	0.62	29
1971	8	13	7	10	32.3778	16	57	53.645	0.28	14	53	57.25	0.83	29
1971	8	13	7	10	40.3780	17	0	11.125	0.80	14	12	31.75	0.94	29
1971	8	13	7	10	48.3780	17	2	29.965	0.29	13	30	53.48	0.61	29
1971	8	13	7	10	56.3781	17	4	50.043	0.22	12	48	40.63	0.81	29
1971	8	13	7	20	40.2476	20	57	59.993	0.48	-33	56	28.15	0.76	29
1971	8	13	7	20	48.2476	21	1	44.582	0.67	-34	13	44.19	0.52	29
1971	8	13	7	20	56.2475	21	5	28.264	0.52	-34	30	8.37	0.63	29
1971	8	13	7	21	4.2476	21	9	10.911	0.60	-34	45	44.41	0.48	29
1971	8	13	7	21	12.2473	21	12	52.716	0.39	-35	0	41.21	1.37	29
1971	8	13	11	23	17.5754	14	28	19.967	0.57	-37	34	50.08	1.15	29
1971	8	13	11	23	25.5755	14	28	38.976	0.40	-38	19	3.45	1.11	29
1971	8	13	11	23	33.5756	14	28	56.997	0.44	-39	3	45.01	0.68	29

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1971	6	20	17	57	30.3670	1	47	53.264	0.72	11	27	14.44	0.67	29
1971	6	20	17	57	38.3598	1	49	52.457	1.01	10	52	29.25	0.53	29
1971	6	20	18	2	10.4919	3	6	50.835	0.32	-9	5	11.16	0.35	29
1971	6	20	18	2	18.4713	3	9	25.065	0.30	-9	36	55.54	0.68	29
1971	6	20	18	2	26.4721	3	11	56.963	0.49	-10	11	21.71	1.11	29
1971	6	20	18	2	34.4717	3	14	31.279	0.28	-10	44	1.18	0.51	29
1971	6	22	9	34	34.0334	1	0	56.871	0.59	46	57	26.83	0.38	30
1971	6	22	15	42	54.8324	19	41	7.873	0.25	47	37	28.30	0.92	31
1971	6	22	15	43	18.8353	19	57	25.907	0.59	45	8	21.29	0.66	31
1971	6	23	13	46	21.7088	1	12	34.049	0.45	32	58	25.57	0.52	31
1971	6	23	13	46	29.7086	1	12	35.259	0.46	31	56	58.41	0.63	31
1971	6	23	13	46	37.7087	1	12	37.528	0.24	30	55	57.37	0.44	31
1971	6	23	13	46	45.7086	1	12	41.265	0.20	29	55	19.09	0.59	31
1971	6	23	13	46	53.7083	1	12	46.557	0.20	28	54	59.38	0.65	31
1971	6	24	9	43	10.2402	23	57	2.498	0.43	46	43	38.08	1.87	30
1971	6	24	9	43	26.2066	23	57	22.866	0.51	43	39	11.54	0.94	30
1971	6	24	15	51	41.9279	18	59	14.632	0.29	28	35	33.08	0.72	31
1971	6	24	15	51	45.9279	19	1	3.671	0.50	28	10	32.79	1.16	31
1971	6	26	23	54	48.0029	23	21	52.976	0.26	9	14	4.33	3.23	28
1971	6	26	23	54	55.9962	23	22	30.768	0.62	8	21	4.45	1.35	28
1971	6	26	23	55	3.9970	23	23	8.821	0.88	7	29	7.04	2.70	28
1971	6	26	23	55	11.9982	23	23	46.788	0.55	6	38	8.07	1.77	28
1971	6	26	23	55	20.0068	23	24	19.862	0.89	5	54	55.55	2.93	28
1971	6	26	23	55	28.0066	23	25	3.215	0.59	4	59	24.02	2.09	28
1971	7	15	15	42	5.3047	1	53	0.897	1.22	-71	52	23.01	0.58	29
1971	7	15	15	42	13.3050	2	5	29.134	0.49	-71	42	49.52	0.32	29
1971	7	15	15	42	21.3049	2	17	36.832	0.49	-71	30	33.83	0.76	29
1971	7	15	15	42	29.3051	2	29	18.762	0.33	-71	15	48.46	0.93	29
1971	7	15	15	42	37.3052	2	40	33.337	0.50	-70	58	35.42	0.44	29
1971	7	15	17	43	30.5403	18	52	13.528	0.15	-58	7	58.57	1.77	29
1971	7	15	17	43	38.5402	18	52	8.693	0.22	-59	0	32.30	0.44	29
1971	7	15	17	43	46.5402	18	52	1.206	0.50	-59	53	34.95	0.53	29
1971	7	15	17	43	54.5402	18	51	52.142	0.40	-60	46	54.58	1.05	29
1971	7	15	17	44	2.5400	18	51	40.847	0.29	-61	40	33.60	0.75	29
1971	7	15	21	3	45.0241	18	20	19.277	0.90	9	51	22.38	1.50	28
1971	7	15	21	3	49.0240	18	22	20.187	0.53	9	10	10.62	1.94	28
1971	7	15	21	3	53.0283	18	24	19.458	0.74	8	29	18.24	2.50	28
1971	7	15	21	3	57.0283	18	26	16.067	0.83	7	49	6.02	0.51	28
1971	7	15	21	4	1.0283	18	28	10.366	0.75	7	9	23.53	1.45	28
1971	7	15	21	4	1.0284	18	28	10.416	0.65	7	9	14.78	0.73	28
1971	7	17	9	10	6.2706	20	43	22.502	0.26	71	19	12.17	0.72	31
1971	7	17	9	10	10.2526	20	43	53.805	0.35	70	43	45.28	0.98	31
1971	7	17	17	51	25.1732	18	34	0.896	0.27	-52	52	32.48	0.67	29

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1971	6	7	7	50	19.7709	11	11	56.215	0.50	7	9	49.77	0.57	29
1971	6	7	7	50	27.7710	11	15	27.168	0.33	8	9	12.56	0.50	29
1971	6	7	8	7	39.1385	14	45	22.751	0.45	16	53	24.94	0.54	31
1971	6	7	8	7	43.1383	14	48	33.223	0.42	18	4	25.32	0.73	31
1971	6	7	8	7	47.1383	14	51	46.143	1.01	19	15	2.81	1.12	31
1971	6	8	8	11	43.4165	13	22	10.361	0.49	24	44	58.13	1.04	31
1971	6	8	8	11	47.4164	13	25	1.282	0.40	26	1	10.47	0.66	31
1971	6	8	8	11	51.4163	13	27	55.438	0.35	27	17	1.69	0.83	31
1971	6	8	8	11	59.4160	13	33	53.820	0.75	29	47	35.00	2.09	31
1971	6	9	8	16	4.5601	12	8	31.891	0.53	34	14	30.81	0.84	31
1971	6	9	8	16	24.5595	12	18	59.581	0.45	40	13	12.46	0.33	31
1971	6	9	8	16	28.5592	12	21	14.073	0.74	41	23	36.10	0.71	31
1971	6	9	8	16	32.5590	12	23	32.583	0.37	42	33	42.59	0.67	31
1971	6	10	4	25	37.0132	18	30	51.557	1.23	32	33	34.37	1.64	30
1971	6	10	4	25	53.0231	18	43	53.956	1.38	33	53	12.47	1.65	30
1971	6	12	4	33	58.9086	18	26	10.569	1.65	53	2	33.94	0.75	30
1971	6	16	6	17	51.5862	6	41	46.555	0.62	-24	18	33.57	0.56	29
1971	6	16	6	18	7.5859	6	49	34.515	0.72	-23	10	54.07	0.65	29
1971	6	17	4	53	2.6317	9	26	36.943	0.37	55	29	51.15	2.42	30
1971	6	17	6	21	4.6957	6	12	48.994	0.35	-23	23	3.95	1.24	29
1971	6	17	6	21	12.6959	6	16	18.277	0.37	-22	55	38.62	0.56	29
1971	6	17	6	21	28.6961	6	23	20.901	0.37	-21	57	46.16	0.60	29
1971	6	17	6	21	36.6962	6	26	52.694	0.86	-21	27	21.81	0.66	29
1971	6	17	6	46	25.9202	10	36	31.106	0.58	51	35	59.92	0.51	31
1971	6	17	6	46	49.9194	10	47	20.340	0.57	57	33	42.24	0.49	31
1971	6	18	6	25	29.3238	6	17	51.237	0.46	-18	35	13.80	0.55	29
1971	6	18	6	25	37.3234	6	21	1.528	0.46	-18	5	26.13	0.56	29
1971	6	18	6	25	45.3231	6	24	0.685	0.64	-17	35	57.08	0.79	29
1971	6	18	6	25	53.3230	6	27	21.466	0.60	-17	3	18.96	1.13	29
1971	6	18	6	30	2.0635	8	3	13.532	0.42	4	11	28.70	0.56	29
1971	6	18	6	30	18.0640	8	9	0.020	0.57	5	45	11.11	0.98	29
1971	6	18	6	30	26.0641	8	11	51.887	0.62	6	32	12.83	1.47	29
1971	6	18	6	30	34.0640	8	14	42.310	0.74	7	19	9.93	0.56	29
1971	6	19	6	29	53.0477	6	21	33.236	0.35	-14	12	51.80	0.84	29
1971	6	19	6	30	1.1062	6	24	24.836	0.49	-13	41	48.19	0.48	29
1971	6	19	6	33	27.2107	7	36	25.764	0.49	2	34	5.12	0.56	29
1971	6	19	6	33	35.2055	7	39	6.287	0.33	3	16	45.51	0.53	29
1971	6	19	6	33	43.2065	7	41	46.096	0.64	3	59	38.27	0.91	29
1971	6	19	6	33	51.2064	7	44	25.007	0.62	4	42	42.53	1.13	29
1971	6	19	6	33	59.2064	7	47	3.507	0.56	5	25	52.43	0.95	29
1971	6	20	15	34	37.1062	21	37	7.183	0.85	61	58	27.08	0.66	31
1971	6	20	15	34	41.1062	21	40	31.652	0.31	61	29	24.69	0.83	31
1971	6	20	15	34	45.1062	21	43	51.649	0.37	60	59	50.62	0.61	31

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1971	5	9	7	35	55.1179	4	54	44.312	0.33	-35	19	59.50	0.88	29
1971	5	9	7	36	3.1289	4	55	2.882	0.47	-36	7	21.88	1.06	29
1971	5	9	7	36	11.1287	4	55	21.917	0.44	-36	55	11.43	0.69	29
1971	5	9	7	36	19.1286	4	55	39.621	0.44	-37	43	38.81	0.99	29
1971	5	9	7	36	27.1285	4	55	57.964	0.32	-38	32	42.61	0.47	29
1971	5	9	7	40	45.0933	4	57	26.854	0.31	-69	58	22.78	1.22	29
1971	5	9	7	40	53.0930	4	56	45.435	0.21	-71	4	19.55	1.06	29
1971	5	9	7	41	1.0929	4	55	54.324	0.31	-72	10	25.80	0.33	29
1971	5	9	7	41	9.0927	4	54	54.203	0.56	-73	16	47.79	0.69	29
1971	5	9	7	41	17.0922	4	53	41.860	0.44	-74	23	14.09	0.65	29
1971	5	13	10	42	2.3930	19	45	13.358	2.03	17	47	4.54	3.52	30
1971	5	14	10	45	37.7291	18	17	17.404	0.97	17	38	47.34	1.21	30
1971	5	16	8	41	59.6901	3	23	10.240	0.30	-70	28	38.97	0.44	29
1971	5	16	8	42	31.6907	3	3	54.431	0.34	-74	3	40.05	0.86	29
1971	5	17	8	46	25.4937	3	27	47.435	0.20	-70	27	20.27	1.36	29
1971	5	17	8	46	33.4940	3	24	17.544	0.28	-71	21	17.26	2.18	29
1971	5	17	8	46	41.4938	3	20	20.336	0.29	-72	15	26.87	1.06	29
1971	5	17	8	46	49.4938	3	15	52.842	0.37	-73	9	46.53	1.33	29
1971	5	17	8	46	57.4937	3	10	48.927	0.28	-74	4	14.43	0.64	29
1971	5	17	8	49	59.7910	19	1	4.125	0.64	-77	50	30.24	1.37	29
1971	5	17	8	50	7.7908	18	50	41.764	0.60	-76	50	27.70	1.43	29
1971	5	17	10	58	41.0430	15	22	14.188	0.40	43	1	59.98	1.51	30
1971	5	18	8	47	31.7084	3	59	6.674	0.53	-50	53	15.53	1.44	29
1971	5	18	8	47	47.7014	3	58	45.395	0.24	-52	14	6.83	1.52	29
1971	5	18	8	47	55.7018	3	58	31.303	0.22	-52	55	34.66	0.78	29
1971	5	20	6	26	58.1548	18	15	14.519	0.40	-78	24	12.29	1.17	29
1971	6	5	6	8	17.2898	18	44	22.101	1.97	55	8	14.23	2.12	30
1971	6	5	13	51	31.3744	23	50	59.225	0.59	63	18	50.01	0.99	31
1971	6	5	13	51	35.3744	23	51	35.996	0.40	62	43	5.10	0.47	31
1971	6	5	13	51	39.3743	23	52	12.284	0.56	62	7	12.24	0.70	31
1971	6	5	13	51	43.3742	23	52	47.806	0.49	61	31	3.74	0.79	31
1971	6	5	13	51	47.3742	23	53	23.253	0.33	60	54	43.90	0.33	31
1971	6	6	6	41	49.7019	16	40	19.297	0.58	63	2	41.12	1.00	30
1971	6	6	6	42	5.7016	17	17	19.666	1.41	65	18	59.37	0.46	30
1971	6	6	6	42	13.7060	17	36	51.724	1.31	66	10	14.60	1.22	30
1971	6	6	6	42	21.6191	17	56	47.447	1.18	66	50	27.31	0.55	30
1971	6	7	7	46	13.5375	8	57	10.787	0.72	-24	21	49.98	0.86	29
1971	6	7	7	46	21.5498	9	2	14.109	0.28	-23	30	40.63	0.47	29
1971	6	7	7	46	29.5495	9	7	16.916	0.23	-22	38	8.12	0.91	29
1971	6	7	7	46	37.5497	9	12	17.097	0.94	-21	44	12.63	0.49	29
1971	6	7	7	46	45.5495	9	17	15.199	0.41	-20	49	0.98	0.62	29
1971	6	7	7	50	3.7717	11	4	44.538	0.31	5	8	43.67	0.77	29
1971	6	7	7	50	11.7709	11	8	21.981	0.64	6	9	37.53	1.19	29

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1971	4	29	11	8	16,1977	5	49	47,853	0,29	-64	20	22,90	0,59	
1971	4	30	7	0	11,2587	9	34	58,437	0.51	-33	33	5,31	0,92	29
1971	4	30	7	0	19,2589	9	39	32,757	0.30	-34	27	44.17	0.11	29
1971	4	30	7	0	27,2591	9	44	13,638	0.48	-35	21	47,97	0.30	29
1971	4	30	7	4	58,6018	13	19	34,541	0.38	-52	26	40,83	0.67	29
1971	4	30	7	5	6,5918	13	26	13,088	0.40	-52	27	19,14	0.40	29
1971	4	30	7	5	14,6017	13	32	45,862	0,71	-52	26	27,82	0.47	29
1971	4	30	7	5	22,6017	13	39	12,650	0,67	-52	24	15,16	0,30	29
1971	4	30	7	5	30,6016	13	45	33,534	0,97	-52	20	41,14	0.58	29
1971	4	30	9	4	59,6755	6	37	19,402	0,70	-51	3	22,25	0.61	29
1971	4	30	9	5	7,6756	6	38	10,161	0.34	-52	7	26,68	1.50	29
1971	4	30	9	5	15,6755	6	39	2,376	0,71	-53	12	14,35	0.66	29
1971	4	30	9	5	23,5913	6	39	55,802	0.93	-54	17	34,49	0.74	29
1971	4	30	9	5	31,6750	6	40	51,832	0,55	-55	23	23,87	0.27	29
1971	5	5	9	25	3,8836	5	22	57,076	0.54	-42	7	57,12	1.21	29
1971	5	5	9	25	11,8842	5	22	46,168	0.48	-42	51	57,58	0.72	29
1971	5	5	9	25	19,8839	5	22	34,165	0.68	-43	36	26,08	1.37	29
1971	5	5	9	25	35,8838	5	22	20,358	0.40	-44	21	25,67	1.20	29
1971	5	5	9	25	35,8838	5	22	5,242	0.27	-45	7	2,01	0.86	29
1971	5	5	9	30	2,1509	4	18	8,244	0.67	-74	47	22,69	2.10	29
1971	5	5	9	30	10,1513	4	10	27,098	0.99	-75	43	29,42	1,90	29
1971	5	5	9	30	18,1521	4	1	36,128	1.16	-76	38	36,35	2,13	29
1971	5	5	9	30	26,1520	3	51	21,920	0.60	-77	32	33,62	0,98	29
1971	5	7	7	30	4,5547	5	45	4,016	0,40	-53	31	4,26	0,35	29
1971	5	7	7	30	12,5548	5	46	16,455	0.92	-54	36	13,01	0,80	29
1971	5	7	7	30	20,5552	5	47	32,329	0,25	-55	41	58,84	0,40	29
1971	5	7	7	30	28,5551	5	48	51,436	0.31	-56	48	7,07	0,83	29
1971	5	7	7	30	36,5552	5	50	14,603	0.48	-57	54	44.50	0,63	29
1971	5	7	9	36	6,6175	5	1	20,798	0.50	-55	43	21,46	0,83	29
1971	5	7	9	36	14,6178	5	0	19,191	0.46	-56	32	28,17	1,41	29
1971	5	7	9	36	22,6175	4	59	12,511	0,58	-57	22	6,94	1.01	29
1971	5	7	9	36	30,6178	4	58	0,277	0.30	-58	12	13,80	0,42	29
1971	5	7	9	36	38,6179	4	56	42,238	0.44	-59	2	49,35	0.49	29
1971	5	8	7	30	14,2919	5	4	27.388	0,33	-26	28	1,61	0,47	29
1971	5	8	7	30	22,2921	5	4	56,439	0.62	-27	11	35.19	0.50	29
1971	5	8	7	30	30,2923	5	5	26,044	0.49	-27	55	44,87	0,89	29
1971	5	8	7	30	38,2922	5	5	55,046	0.59	-28	40	25,70	1.08	29
1971	5	8	7	30	46,2921	5	6	24,307	0,81	-29	25	46,98	1,06	29
1971	5	8	7	35	13,1021	5	24	16,942	0.25	-60	27	11,74	0,66	29
1971	5	8	7	35	21,1023	5	24	57,509	0.16	-61	32	44,66	0,57	29
1971	5	8	7	35	29,1024	5	25	38,935	0,52	-62	38	41,22	0,30	29
1971	5	8	7	35	37,1023	5	26	21,673	0.44	-63	45	3,08	0.27	29
1971	5	8	7	35	45,1025	5	27	5,907	0.38	-64	51	47,67	0.70	29

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1971	4	6	19	3	4.0161	9	6	7.569	0.64	3	10	12.18	0.95	28
1971	4	6	19	3	12.0161	9	8	44.037	0.48	2	19	51.47	0.71	28
1971	4	6	19	3	20.0164	9	11	18.198	1.01	1	30	0.96	1.66	28
1971	4	6	19	3	28.0167	9	13	48.824	1.07	0	41	2.60	1.54	28
1971	4	28	8	52	18.3952	6	51	26.707	0.43	-19	47	21.91	1.16	29
1971	4	28	8	52	26.3951	6	52	22.990	0.27	-20	34	23.91	0.57	29
1971	4	28	8	52	34.3953	6	53	20.290	0.23	-21	22	8.26	0.38	29
1971	4	28	8	52	42.3954	6	54	18.601	0.32	-22	10	33.98	0.59	29
1971	4	28	8	52	50.3958	6	55	17.655	0.30	-22	59	42.25	0.65	29
1971	4	28	8	56	57.9471	7	43	8.175	0.42	-54	16	49.97	0.56	29
1971	4	28	8	57	5.9480	7	45	53.740	0.47	-55	26	50.61	0.40	29
1971	4	28	8	57	13.9487	7	48	49.245	0.41	-56	37	12.83	0.83	29
1971	4	28	8	57	21.9486	7	51	55.837	0.20	-57	47	40.95	0.91	29
1971	4	28	8	57	29.9482	7	55	14.720	0.72	-58	58	16.44	0.93	29
1971	4	29	6	50	37.8890	8	3	50.209	0.71	4	11	56.74	1.74	29
1971	4	29	6	50	45.8895	8	5	51.604	0.50	3	31	20.55	0.97	29
1971	4	29	6	50	53.8895	8	7	54.676	0.55	2	50	16.27	0.94	29
1971	4	29	6	51	1.8896	8	9	59.626	0.35	2	8	42.04	0.67	29
1971	4	29	6	51	9.8897	8	12	6.663	0.20	1	26	28.67	0.35	29
1971	4	29	6	55	39.5577	9	51	59.091	0.46	-26	22	53.20	0.54	29
1971	4	29	6	55	47.5579	9	56	5.873	0.37	-27	14	26.27	1.59	29
1971	4	29	6	55	55.5575	10	0	18.833	0.35	-28	5	47.56	0.56	29
1971	4	29	6	56	3.5576	10	4	35.487	0.82	-28	56	24.61	0.99	29
1971	4	29	6	56	11.5576	10	8	58.520	0.37	-29	46	43.28	1.44	29
1971	4	29	8	56	30.8951	6	32	56.371	0.39	-21	23	8.00	0.43	29
1971	4	29	8	56	38.8953	6	33	40.164	0.47	-22	8	13.32	1.04	29
1971	4	29	8	56	46.8956	6	34	24.652	0.19	-22	54	4.43	0.65	29
1971	4	29	8	56	54.8956	6	35	9.454	0.48	-23	40	28.24	1.34	29
1971	4	29	8	57	2.8951	6	35	54.654	0.39	-24	27	34.37	1.87	29
1971	4	29	9	1	12.8525	7	9	29.568	0.59	-54	51	24.53	1.04	29
1971	4	29	9	1	20.8534	7	11	16.543	0.29	-56	0	1.56	1.29	29
1971	4	29	9	1	28.8538	7	13	8.670	0.15	-57	9	9.40	0.35	29
1971	4	29	9	1	36.8539	7	15	8.035	1.14	-58	18	38.65	0.43	29
1971	4	29	9	1	44.8591	7	17	14.006	0.24	-59	28	33.08	0.31	29
1971	4	29	11	4	35.6459	6	17	19.064	0.34	-42	3	29.57	0.34	29
1971	4	29	11	4	43.6455	6	17	3.344	0.19	-42	45	6.92	0.75	29
1971	4	29	11	4	51.6455	6	16	46.336	0.36	-43	27	18.77	0.70	29
1971	4	29	11	4	59.6459	6	16	27.255	0.35	-44	9	58.53	0.53	29
1971	4	29	11	5	7.6457	6	16	6.518	0.42	-44	53	6.47	1.30	29
1971	4	29	11	7	44.1980	5	58	26.610	0.45	-60	43	18.99	0.68	29
1971	4	29	11	7	52.1982	5	56	33.540	0.29	-61	37	1.22	0.95	29
1971	4	29	11	8	0.1981	5	54	30.053	0.40	-62	31	8.86	0.34	29
1971	4	29	11	8	8.1979	5	52	15.217	0.23	-63	25	37.51	0.75	29

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1971	2	26	12	44	50,4692	15	38	13,133	0.87	-3	56	34.21	1.32	30
1971	2	26	12	44	56,4704	15	40	17,950	0,33	-4	44	58,52	0.47	30
1971	2	26	12	45	6,4735	15	42	21,254	0.48	-5	32	42,59	1,54	30
1971	2	27	10	37	39,2580	15	15	9,795	1.15	76	18	5,22	2,33	31
1971	2	27	12	37	49,2616	19	7	58,653	1,18	64	45	55,05	1,10	31
1971	2	27	10	41	35,9048	18	30	27,052	0.19	46	5	53,68	0,80	31
1971	2	27	12	49	23,8434	15	12	54.149	0,38	-9	31	58,51	0.91	30
1971	2	27	12	49	39,8459	15	17	4,724	0,75	-11	1	16,26	0,76	30
1971	2	27	14	42	44,0044	13	11	38,510	0,69	69	52	37,52	0,63	31
1971	2	27	14	48	5,3077	16	10	17,313	1,14	35	32	45,74	1.51	31
1971	2	28	10	48	4,6359	17	0	34,367	0.24	16	6	43,80	0.87	30
1971	2	28	10	48	20,6367	17	2	13,391	0.59	14	30	9,48	1,20	30
1971	2	28	10	48	28,6365	17	3	2,815	0.26	13	42	42,22	1,44	30
1971	2	28	20	39	9,9554	20	17	58,062	1,05	79	41	56,87	3,14	31
1971	3	3	4	32	41,6981	17	53	0,684	0.85	76	44	25.62	2,09	30
1971	3	3	4	33	13,6974	17	16	21,468	0.70	74	11	28,89	1,39	30
1971	3	3	4	33	29,7032	17	3	6,646	0.47	72	51	17,76	1,02	30
1971	3	3	4	34	1,6935	16	52	10,229	0.87	71	29	38,74	1,08	30
1971	3	3	12	56	36,8706	10	42	56,547	1.82	23	58	7,37	1,46	30
1971	3	3	12	56	52,8680	10	48	26,857	0,45	23	6	51.34	0.97	30
1971	3	3	12	57	8,8641	10	53	56,887	1.29	22	13	11,53	1,35	30
1971	3	3	12	57	24,8646	10	59	23,984	1.40	21	17	36.99	1.46	30
1971	3	4	8	30	58,3162	1	14	18,158	0.82	45	46	57,14	1,24	30
1971	3	4	8	31	22,3136	1	10	2,473	0,61	49	3	43.38	2.71	30
1971	3	4	8	31	30,3126	1	8	24,255	0.68	50	9	35,12	0,60	30
1971	3	6	6	53	57,6377	18	44	27,920	1,14	69	32	54,69	0.99	30
1971	3	6	6	54	13,6349	18	31	10,331	1.36	68	26	33,64	1.72	30
1971	3	6	6	55	1,6240	17	59	33,521	0.54	64	47	42,53	2,46	30
1971	3	6	18	41	25,3973	1	5	59,839	0.83	46	52	18,12	0.93	30
1971	3	6	18	48	22,4436	16	34	39,641	7,91	70	21	6,07	1,11	30
1971	3	6	20	52	47,9656	21	1	4,856	1,04	75	13	16,54	0,78	30
1971	3	6	23	16	50,3151	12	11	51,803	0,91	-2	48	31,27	0,79	31
1971	3	7	15	26	21,9719	12	46	50,240	0,43	-25	33	33,37	0,97	31
1971	3	8	15	28	44,1343	12	8	33,185	0,35	-17	29	6,26	0,40	31
1971	3	25	20	8	28,0175	4	12	5,877	2.07	72	31	49,37	6,65	28
1971	3	25	20	8	36,0176	4	24	6,541	1,49	73	5	12,01	1,47	28
1971	4	6	19	2	8,0161	8	46	22,897	0,85	9	19	15,90	0,64	28
1971	4	6	19	2	16,0160	8	49	21.618	1.31	8	25	4.06	1.06	28
1971	4	6	19	2	24,0158	8	52	18,136	1.27	7	31	14,07	1.91	28
1971	4	6	19	2	32,0157	8	55	10,221	0.32	6	37	48,75	1.29	28
1971	4	6	19	2	40,0157	8	57	59,459	0.47	5	45	3.71	0,60	28
1971	4	6	19	2	48,0157	9	0	45,594	1,15	4	52	52,30	1.45	28
1971	4	6	19	2	56,0159	9	3	27,890	0.45	4	1	17,73	1.80	28

SATELLITE 1965 089 A GEOS-A SDC NUMBER 1726

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	1	9	13	6	49.3097	12	52	20.021	0.58	-11	3	21.33	2.15	30
1971	1	9	13	7	5.3101	12	59	5.729	0.95	-8	44	56.74	2.03	30
1971	1	9	13	7	21.3109	13	6	3.347	0.59	-6	22	0.72	2.14	30
1971	1	9	13	7	53.3150	13	20	36.406	0.64	-1	24	30.42	0.94	30
1971	1	10	13	11	11.2814	12	17	49.996	1.02	-4	47	38.62	2.23	30
1971	1	10	13	11	43.2822	12	31	30.819	0.61	0	18	57.76	1.68	30
1971	1	10	13	11	59.2838	12	38	45.381	0.54	2	59	31.95	1.23	30
1971	1	10	13	12	15.2859	12	46	16.931	0.79	5	44	6.75	1.66	30
1971	1	11	13	15	28.0967	11	39	35.017	0.74	1	13	4.32	0.71	30
1971	1	11	13	15	44.0972	11	45	44.866	1.37	3	52	4.98	1.02	30
1971	1	11	13	16	0.1296	11	52	12.062	1.09	6	36	59.23	1.43	30
1971	1	11	13	16	16.0993	11	58	57.542	0.91	9	27	9.01	1.83	30
1971	1	13	2	21	33.3059	4	11	19.272	1.23	13	15	46.55	1.12	30
1971	1	13	13	31	37.2331	17	32	42.144	1.21	72	31	34.97	1.55	30
1971	1	13	13	32	9.2351	18	17	12.836	0.80	71	15	30.07	0.79	30
1971	1	13	13	32	25.2357	18	35	58.533	0.93	70	28	3.94	1.04	30
1971	1	13	13	32	41.2363	18	52	42.450	0.60	69	36	23.65	1.58	30
1971	1	14	13	35	37.4285	17	0	26.068	1.03	79	11	1.76	0.85	30
1971	1	19	13	50	42.9795	8	13	27.517	0.42	34	30	12.63	0.85	30
1971	1	19	13	50	58.9785	8	13	5.060	0.50	36	23	30.14	0.67	30
1971	1	19	13	51	14.9773	8	12	34.970	0.48	38	18	19.72	1.19	30
1971	1	19	13	51	30.9755	8	11	57.124	0.26	40	14	39.77	1.60	30
1971	1	19	13	51	46.9732	8	11	10.327	0.45	42	12	21.78	0.40	30
1971	1	19	13	57	17.9763	5	8	58.175	1.02	80	16	48.14	0.68	30
1971	1	20	11	56	58.3486	17	7	11.728	0.39	69	41	15.39	0.43	30
1971	1	20	11	57	14.3493	17	25	26.819	0.38	68	57	55.64	0.49	30
1971	1	20	11	57	30.3493	17	41	49.029	0.46	68	10	18.92	0.73	30
1971	2	18	2	0	13.2457	3	2	30.837	1.17	83	9	56.50	1.56	30
1971	2	19	[illegible]	6	50.1189	11	49	33.029	1.21	60	40	2.74	0.36	30
1971	2	20	7	37	7.9681	2	55	27.494	0.70	5	56	19.47	1.10	31
1971	2	21	5	36	30.4744	6	26	46.282	0.68	-37	37	59.87	2.53	31
1971	2	21	14	16	46.4994	19	58	7.952	0.67	70	39	52.87	1.16	31
1971	2	22	12	27	51.9690	17	35	39.556	0.37	10	54	46.71	0.71	30
1971	2	22	12	28	7.9695	17	37	57.350	0.42	9	15	58.61	1.44	30
1971	2	22	12	28	55.9682	17	44	33.848	0.58	4	35	7.48	1.86	30
1971	2	23	22	28	2.9569	17	53	56.194	0.82	52	10	19.67	1.82	31
1971	2	24	6	1	35.2491	2	34	3.311	0.28	45	41	43.06	2.02	30
1971	2	25	5	53	27.9151	2	58	9.226	0.37	-12	10	30.78	0.91	31
1971	2	25	5	56	4.9313	3	54	22.781	1.13	23	47	36.07	2.27	31
1971	2	25	5	58	58.0731	5	58	56.744	1.68	63	19	43.19	1.66	31
1971	2	25	6	5	41.1851	2	20	54.696	0.56	43	52	45.11	0.84	30
1971	2	25	14	34	27.7345	16	5	42.867	0.75	74	53	46.04	1.19	31
1971	2	25	14	44	27.4087	18	9	53.008	0.20	5	27	22.20	0.31	31

SATELLITE 1964 056 B PAGEOS-A/RCK BDY SDC NUMBER 2255

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	4	6	14	18	55.9991	8	26	59.167	0.33	-46	6	1.51	0.71	29
1971	4	6	14	19	11.9986	8	30	39.724	0.52	-45	22	14.97	1.01	29
1971	4	6	14	19	27.9976	8	34	13.613	0.21	-44	37	50.71	0.89	29
1971	4	6	14	19	43.9959	8	37	41.204	0.73	-43	52	50.28	1.42	29
1971	4	6	14	19	59.9952	8	41	2.095	0.51	-43	7	19.07	0.64	29
1971	4	6	14	20	15.9931	8	44	17.394	0.53	-42	21	12.34	0.76	29
1971	4	6	14	20	31.9916	8	47	26.251	0.73	-41	34	36.74	0.44	29
1971	4	25	11	33	4.0008	13	23	14.433	0.49	-49	8	24.86	2.13	40
1971	4	25	11	33	4.0049	10	14	43.387	0.24	-30	58	4.22	0.55	29
1971	4	25	11	33	12.0007	13	22	18.967	0.22	-48	34	51.80	0.64	40
1971	4	25	11	33	12.0050	10	15	27.764	0.42	-30	24	4.23	0.70	29
1971	4	25	11	33	20.0007	13	21	24.698	0.51	-48	1	20.97	0.51	40
1971	4	25	11	33	20.0050	10	16	11.357	0.25	-29	50	9.19	0.59	29
1971	4	25	11	33	28.0007	13	20	31.678	0.74	-47	27	36.79	2.03	40
1971	4	25	11	33	28.0052	10	16	54.105	0.32	-29	16	16.72	0.59	29
1971	4	25	11	33	36.0007	13	19	40.039	0.71	-46	53	44.39	0.39	40
1971	4	25	11	33	36.0051	10	17	35.911	0.20	-28	42	25.79	0.23	29
1971	4	25	11	33	44.0005	13	18	49.534	0.47	-46	19	44.88	0.87	40
1971	4	25	11	33	44.0051	10	18	17.008	0.33	-28	8	40.36	1.22	29
1971	4	25	11	33	51.0048	10	19	36.799	0.26	-27	1	18.83	0.62	29
1971	4	25	11	33	51.0059	10	18	57.310	0.44	-27	35	0.85	1.28	29
1971	4	25	11	33	52.0006	13	17	59.778	0.34	-45	45	30.57	0.81	40
1971	4	25	11	34	0.0005	13	17	11.809	0.29	-45	11	19.64	0.69	40
1971	4	25	11	34	8.0004	13	16	24.500	0.50	-44	36	57.74	0.61	40
1971	4	25	11	34	8.0513	10	20	15.694	0.31	-26	27	48.16	0.79	29
1971	4	25	11	34	16.0006	13	15	38.224	0.39	-44	2	26.98	0.70	40
1971	4	25	11	34	16.0045	10	20	53.746	0.49	-25	54	19.74	0.76	29
1971	4	26	11	36	48.0022	9	1	46.438	0.41	-54	22	23.79	0.95	29
1971	4	26	11	36	48.0037	14	25	39.035	0.25	-74	12	9.82	1.59	40
1971	4	26	11	36	56.0025	9	3	52.358	0.36	-53	53	28.62	0.87	29
1971	4	26	11	36	56.0036	14	21	50.533	0.24	-73	48	29.47	1.17	40
1971	4	26	11	37	4.0025	9	5	55.607	0.45	-53	24	22.32	0.40	29
1971	4	26	11	37	4.0034	14	18	12.048	0.64	-73	24	26.17	1.03	40
1971	4	26	11	37	12.0023	9	7	55.569	0.12	-52	55	3.07	0.79	29
1971	4	26	11	37	12.0032	14	14	42.994	0.52	-73	0	3.06	1.43	40
1971	4	26	11	37	20.0024	9	9	53.110	0.28	-52	25	28.37	0.47	29
1971	4	26	11	37	20.0034	14	11	22.255	0.47	-72	35	16.43	0.38	40
1971	4	26	11	37	28.0022	9	11	47.742	0.37	-51	55	43.78	0.66	29
1971	4	26	11	37	28.0033	14	8	10.009	0.67	-72	10	7.48	1.36	40
1971	4	26	11	37	36.0023	9	13	39.803	0.46	-51	25	50.09	1.02	29
1971	4	26	11	37	36.0031	14	5	5.232	0.62	-71	44	36.46	1.23	40
1971	4	26	11	37	44.0023	9	15	29.499	0.69	-50	55	39.60	0.63	29
1971	4	26	11	37	44.0031	14	2	9.091	0.36	-71	18	53.18	0.99	40

SATELLITE 1964 056 B PAGEOS-A/RCK BDY SDC NUMBER 2255

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	3	16	18	53	36,0051	15	10	46,512	0,26	-62	47	13,91	1,11	40
1971	3	16	18	53	36,0068	10	14	37,804	0,25	-56	7	59,96	0,30	29
1971	3	16	18	53	44,0029	15	8	19,099	1,04	-62	24	6,75	0,12	40
1971	3	16	18	53	44,0067	10	16	12,616	0,31	-55	33	2,97	0,62	29
1971	3	16	18	53	52,0027	15	5	55,817	0,49	-62	0	47,04	0,64	40
1971	3	16	18	53	52,0066	10	17	44,223	0,37	-54	58	0,98	0,81	29
1971	3	16	18	54	0,0064	10	19	13,715	0,27	-54	22	38,70	0,50	29
1971	3	16	18	54	0,0061	10	20	40,805	0,29	-53	47	10,73	0,25	29
1971	3	17	18	52	32,0027	15	32	38,251	0,68	-65	40	34,72	1.53	40
1971	3	21	18	42	7,9996	12	44	0,666	0,57	-79	11	46,16	0,38	40
1971	3	21	18	42	8,0044	8	55	34,395	0,61	-49	33	4,39	1,11	29
1971	3	21	18	42	15,9206	8	57	31,957	1.20	-49	6	44,02	1,59	29
1971	3	21	18	42	15,9997	12	42	16,889	0,35	-78	43	25,54	0,78	40
1971	3	21	18	42	23,9995	12	40	40,695	0,54	-78	14	47,99	1,24	40
1971	3	21	18	42	24,0045	8	59	26,726	0,42	-48	40	25,55	0,51	29
1971	3	21	18	42	31,9994	12	39	10,891	0,68	-77	45	56,92	0,62	40
1971	3	21	18	42	32,0042	9	1	19,918	0,44	-48	13	48,25	0,45	29
1971	3	21	18	42	39,9995	12	37	48,280	0,49	-77	16	54,93	0,71	40
1971	3	21	18	42	40,0043	9	3	10,406	0,30	-47	47	0,03	0,49	29
1971	3	21	18	42	47,9994	12	36	30,564	0,45	-76	47	39,78	0,83	40
1971	3	21	18	42	48,0040	9	4	58,990	0,33	-47	20	3,38	0,53	29
1971	3	21	18	42	55,9994	12	35	18,443	0,80	-76	18	14,63	1,47	40
1971	3	21	18	42	56,0040	9	6	45,496	0,33	-46	52	52,06	0,81	29
1971	3	21	18	43	3,9992	12	34	11,323	0,59	-75	48	30,46	0,90	40
1971	3	21	18	43	4,0039	9	8	30,008	0,22	-46	25	36,91	1,02	29
1971	3	21	18	43	11,9992	12	33	7,500	0,81	-75	18	45,31	0,77	40
1971	3	21	18	43	12,0035	9	10	12,478	0,46	-45	58	12,65	0,59	29
1971	3	21	18	43	19,9993	12	32	0,367	0,26	-74	48	45,05	0,57	40
1971	3	21	18	43	20,0032	9	11	52,872	0,55	-45	30	36,51	0,86	29
1971	3	21	18	43	27,9991	12	31	12,538	0,78	-74	18	33,37	1,15	40
1971	4	5	14	8	28,0122	8	19	11,742	0,70	-49	34	1,37	0,42	29
1971	4	5	14	8	44,0125	8	23	23,142	0,31	-48	50	28,25	0,61	29
1971	4	5	14	9	0,0116	8	27	25,445	0,30	-48	6	4,71	0,47	29
1971	4	5	14	9	16,0115	8	31	20,970	0,39	-47	20	52,67	0,77	29
1971	4	5	14	9	32,0105	8	35	8,927	0,32	-46	34	59,01	0,49	29
1971	4	5	14	9	48,0100	8	38	49,189	0,88	-45	48	20,79	1,34	29
1971	4	5	14	10	4,0086	8	42	22,578	0,53	-45	1	6,02	0,73	29
1971	4	5	14	10	20,0071	8	45	48,935	0,80	-44	13	12,97	0,99	29
1971	4	5	14	10	36,0053	8	49	8,886	0,53	-43	24	50,49	0,61	29
1971	4	5	14	10	52,0041	8	52	22,069	0,62	-42	35	52,27	1,01	29
1971	4	6	14	18	8,0003	8	15	15,958	0,62	-48	13	4,42	0,62	29
1971	4	6	14	18	24,0005	8	19	17,543	0,59	-47	31	23,32	0,54	29
1971	4	6	14	18	40,0001	8	23	12,019	0,40	-46	49	6,31	0,49	29

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	2	18	15	38	15,9931	15	10	3,815	0.46	-58	24	47,17	0,63	40
1971	2	18	15	38	23,9929	15	8	3,763	0.38	-58	0	13,91	0,99	40
1971	2	18	15	38	31,9929	15	6	6,557	0.35	-57	35	20,43	0,47	40
1971	2	18	15	38	39,9930	15	4	11,403	0,51	-57	10	16,58	0,64	40
1971	2	18	15	38	47,9930	15	2	18,916	0,29	-56	45	0,69	0,78	40
1971	2	18	15	38	55,9933	15	0	29,861	0,35	-56	19	28,31	0,60	40
1971	2	18	15	39	3,9933	14	58	41,581	0,38	-55	53	39,86	0,69	40
1971	2	18	15	39	11,9933	14	56	56,694	0.32	-55	27	38,89	0,68	40
1971	2	18	15	39	19,9936	14	55	13,690	0,44	-55	1	30,28	0,72	40
1971	2	18	15	39	27,9932	14	53	32,890	0,42	-54	35	2,86	0,95	40
1971	2	18	15	39	35,9935	14	51	54,190	0,30	-54	8	27,70	0,91	40
1971	2	25	16	41	19,9882	2	26	4,831	0,66	-84	59	47,93	0,91	40
1971	2	25	16	41	35,9875	2	50	57,447	0,41	-85	36	27,91	1,59	40
1971	2	25	16	41	51,9872	3	23	50,597	0,71	-86	9	24,22	0,86	40
1971	2	25	16	41	52,0060	7	49	56,418	0,68	-56	42	55,35	0,55	29
1971	2	25	16	42	7,9875	4	6	56,109	0,32	-86	36	21,34	0,49	40
1971	2	25	16	42	8,0062	7	55	43,131	0,53	-56	7	49,01	0,59	29
1971	2	25	16	42	23,9878	5	1	23,143	0,89	-86	54	19,51	1,05	40
1971	2	25	16	42	24,0060	8	1	19,548	0,55	-55	31	23,67	0,97	29
1971	2	25	16	42	39,9873	6	3	50,854	0,58	-87	0	7,37	0,66	40
1971	2	25	16	42	40,0058	8	6	45,811	0,31	-54	53	32,12	1,43	29
1971	2	25	16	42	55,9864	7	6	22,574	0,99	-86	52	6,93	0,60	40
1971	2	25	16	42	56,0074	8	12	2,517	0,59	-54	14	32,86	1,16	29
1971	2	25	16	43	12,0047	8	17	9,313	0,32	-53	34	19,33	0,34	29
1971	2	25	16	43	12,0058	8	0	42,684	0,54	-86	31	24,23	0,51	40
1971	2	25	16	43	28,0043	8	22	6,365	0,87	-52	52	57,50	0,90	29
1971	2	25	16	43	28,0050	8	43	54,138	0,43	-86	0	52,73	1,38	40
1971	2	25	16	43	44,0022	8	26	53,790	0,61	-52	10	26,27	0,30	29
1971	2	25	16	43	45,9845	9	41	35,660	0,59	-84	41	6,65	1,48	40
1971	2	25	16	44	15,9993	8	36	0,990	0,45	-50	42	20,93	1,03	29
1971	3	16	13	52	32,0069	10	0	1,902	0,45	-60	40	42,95	0,59	29
1971	3	16	13	52	40,0072	10	2	4,465	0,10	-60	7	24,21	0,60	29
1971	3	16	13	52	48,0059	15	26	46,491	0,68	-64	59	12,67	1,21	40
1971	3	16	13	52	48,0072	10	4	2,701	0,24	-59	33	50,32	0,34	29
1971	3	16	13	52	56,0026	15	23	57,192	0,14	-64	38	2,27	0,65	40
1971	3	16	13	52	56,0071	10	5	57,173	0,54	-59	0	2,62	0,34	29
1971	3	16	13	53	4,0029	15	21	11,858	0,54	-64	16	27,16	0,61	40
1971	3	16	13	53	4,0070	10	7	48,811	0,22	-58	26	3,54	0,56	29
1971	3	16	13	53	12,0027	15	18	29,195	0,91	-63	54	39,33	1,19	40
1971	3	16	13	53	12,0072	10	9	35,303	0,70	-57	51	50,36	0,93	29
1971	3	16	13	53	20,0114	10	11	19,763	0,34	-57	17	25,86	0,82	29
1971	3	16	13	53	28,0068	10	13	0,309	0,53	-56	42	49,00	0,28	29
1971	3	16	13	53	28,0068	15	13	16,802	0,29	-63	9	58,73	0,95	40

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	2	3	16	9	4,9971	15	45	47,891	0,38	-55	18	8,66	0.46	40
1971	2	3	16	9	12,9971	15	43	51,810	0,55	-54	57	7,41	0.54	40
1971	2	3	16	9	20,9969	15	41	58,263	0,33	-54	35	54,70	0,25	40
1971	2	3	16	9	28,9967	15	40	6,193	0,56	-54	14	28,09	0,47	40
1971	2	3	16	9	36,9968	15	38	16,389	0,34	-53	52	47,93	0,51	40
1971	2	3	16	9	44,9970	15	36	28,210	0,26	-53	30	56,83	0,47	40
1971	2	3	16	10	0,9970	15	32	57,841	0,40	-52	46	34,91	0,44	40
1971	2	3	16	10	8,9972	15	31	15,287	0,36	-52	24	8,18	0,32	40
1971	2	3	16	10	16,9973	15	29	34,600	0,55	-52	1	28,29	0,96	40
1971	2	8	15	38	8,0023	10	43	19,517	0,16	-53	23	52,00	0,64	29
1971	2	8	15	38	16,0026	10	44	33,075	0,50	-52	47	5,37	0,91	29
1971	2	8	15	38	24,0027	10	45	44,448	0,23	-52	10	12,86	0,39	29
1971	2	8	15	38	32,0026	10	46	53,617	0,32	-51	33	14,05	1.02	29
1971	2	8	15	38	40,0027	10	48	0,900	0,48	-50	56	7,89	0,34	29
1971	2	8	15	38	48,0024	10	49	6,279	0,35	-50	18	56,98	0,61	29
1971	2	8	15	38	56,0024	10	50	9,758	0,19	-49	41	37,18	0,57	29
1971	2	8	15	39	4,0025	10	51	11,594	0,44	-49	4	16,04	0,45	29
1971	2	8	15	39	12,0022	10	52	11,633	0,29	-48	26	46,41	0,75	29
1971	2	8	15	39	20,0025	10	53	10,390	0,17	-47	49	13,71	0.95	29
1971	2	17	15	26	7,9861	15	54	47,910	0,99	-61	28	57,40	2.11	40
1971	2	17	15	26	8,0006	10	46	32,964	0,27	-64	12	44,58	0,78	29
1971	2	17	15	26	16,0010	10	48	13,507	0,23	-63	37	12,07	0,34	29
1971	2	17	15	26	23,9970	15	49	45,426	0,47	-60	49	37,84	0,88	40
1971	2	17	15	26	24,0009	10	49	50,272	0,34	-63	1	26,91	0,50	29
1971	2	17	15	26	31,9970	15	47	18,981	0,67	-60	29	34,05	1,45	40
1971	2	17	15	26	32,0008	10	51	22,733	0,22	-62	25	31,07	0,60	29
1971	2	17	15	26	39,9970	15	44	54,124	0,48	-60	9	12,63	0,77	40
1971	2	17	15	26	40,0009	10	52	52,167	0,12	-61	49	21,97	0,37	29
1971	2	17	15	26	47,9969	15	42	33,132	0,50	-59	48	37,37	0.91	40
1971	2	17	15	26	55,9969	15	40	14,704	0,31	-59	27	41,24	0,61	40
1971	2	17	15	26	56,0009	10	55	40,550	0,23	-60	36	33,48	0,30	29
1971	2	17	15	27	3,9863	15	37	58,630	0,57	-59	6	36,72	1.42	40
1971	2	17	15	27	4,0008	10	57	0,462	0,37	-59	59	51,87	0.37	29
1971	2	17	15	27	11,9865	15	35	45,077	0,61	-58	45	8,66	0,55	40
1971	2	17	15	27	19,9971	15	33	34,013	0,39	-58	23	23,24	1.25	40
1971	2	17	15	27	27,9973	15	31	26,029	0,31	-58	1	27,74	0.55	40
1971	2	17	15	27	35,9867	15	29	19,390	0,73	-57	39	18,39	0,76	40
1971	2	17	15	27	36,0007	11	1	51,955	0,20	-57	31	33,53	0,50	29
1971	2	17	15	27	43,9867	15	27	16,853	0,92	-57	16	52,45	1.01	40
1971	2	17	15	27	44,0005	11	2	58,519	0,36	-56	54	8,59	1,52	29
1971	2	17	15	27	51,9869	15	25	15,906	1,32	-56	54	5,80	1,59	40
1971	2	17	15	27	52,0002	11	4	3,002	0,40	-56	16	30,27	0.53	29
1971	2	18	15	38	7,9929	15	12	5,879	0.43	-58	49	5,37	1.10	40

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	10	25	1	48	32.9438	22	2	59.739	1.22	63	6	14.69	0.79	28
1971	10	25	1	48	40.9367	21	58	50.367	0.74	63	20	59.11	0.79	28
1971	10	25	1	48	48.9348	21	54	38.834	0.92	63	34	56.26	1.91	28
1971	10	26	1	52	8.6545	21	55	44.468	0.83	62	21	54.21	1.05	28
1971	10	26	1	52	16.6545	21	51	31.456	0.46	62	36	2.59	1.27	28
1971	10	26	1	52	24.6630	21	47	40.609	0.58	62	48	23.68	0.83	28
1971	10	26	1	52	32.6632	21	43	34.893	0.33	63	0	50.28	0.39	28
1971	10	26	1	52	40.6633	21	39	25.745	0.50	63	12	48.34	1.11	28
1971	11	5	23	29	50.9432	20	31	59.287	0.35	83	1	28.02	0.87	28
1971	11	5	23	29	58.9441	20	14	31.876	0.27	82	59	56.84	0.67	28
1971	11	5	23	30	6.9441	19	57	16.394	0.40	82	55	58.19	1.22	28
1971	11	5	23	30	14.9440	19	40	40.849	0.52	82	49	46.14	0.62	28
1971	11	5	23	30	22.9441	19	24	43.562	0.64	82	41	27.46	0.88	28
1971	11	14	21	5	17.7949	9	45	54.848	0.77	71	17	22.66	0.34	28
1971	11	14	21	5	25.7948	9	51	54.618	1.48	71	14	2.21	1.03	28
1971	11	14	21	5	33.7945	9	57	53.544	1.32	71	9	53.11	0.94	28
1971	11	14	21	5	41.7943	10	3	48.982	1.30	71	5	0.34	0.48	28
1971	11	14	21	5	49.7939	10	9	23.868	1.24	70	59	37.79	0.99	28
1971	11	17	21	17	26.0537	10	34	59.146	1.06	75	55	37.56	1.03	28
1971	12	11	22	56	42.2659	20	32	42.338	1.51	63	50	8.24	0.32	28
1971	12	11	22	56	58.2656	20	25	29.685	0.56	63	58	24.07	0.97	28
1971	12	11	22	57	14.2651	20	18	20.868	1.21	64	5	2.10	0.61	28
1971	12	12	23	0	53.1446	20	36	11.703	0.47	63	0	8.48	0.50	28
1971	12	12	23	1	9.1446	20	29	16.428	0.33	63	9	11.32	0.92	28
1971	12	12	23	1	25.1445	20	22	21.503	0.37	63	16	32.62	0.82	28
1971	12	12	23	1	57.1433	20	8	25.692	0.59	63	26	44.71	0.97	28
1971	12	14	19	47	37.9144	2	49	54.960	1.59	62	8	8.21	1.28	28
1971	12	14	19	47	45.9140	2	50	21.205	1.37	62	47	18.96	1.07	28
1971	12	14	19	47	53.9144	2	50	48.268	1.30	63	27	27.10	0.54	28
1971	12	14	19	48	1.9230	2	51	11.174	0.26	64	6	42.56	0.54	28
1971	12	14	19	48	9.9231	2	51	37.547	0.27	64	45	47.87	0.65	28
1971	12	15	20	6	17.6497	2	25	39.419	1.55	83	18	19.54	0.54	28
1971	12	15	20	6	33.6680	2	24	28.928	0.97	84	20	12.08	0.99	28
1971	12	15	20	6	49.6680	2	23	13.884	1.24	85	22	36.72	0.45	28
1971	12	15	20	7	5.6675	2	20	44.279	1.12	86	23	36.04	0.47	28
1971	12	16	20	12	30.9049	18	3	1.412	1.50	87	24	42.77	1.75	28
1971	12	16	20	12	38.9050	17	33	11.601	0.50	87	6	56.76	0.94	28
1971	12	16	20	12	54.9053	16	50	20.976	0.78	86	25	28.45	1.39	28
1971	12	16	20	13	2.9052	16	35	7.832	0.45	86	2	56.86	0.25	28

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DATE						R.A.1950.0			RMS	DECL.1950.0			RMS	STATION
YEAR	MO	DA	HR	MIN	SEC	HR	MIN	SEC		DEG	MIN	SEC		
1971	7	23	11	12	0,0076	13	34	1,192	0,44	-12	4	36,08	0,66	29
1971	7	23	11	12	8,0075	13	33	35,199	0,28	-12	32	10,16	0,30	29
1971	7	23	11	12	16,0075	13	33	9,678	0,25	-12	59	49,75	0,44	29
1971	7	23	11	12	24,0077	13	32	43,231	0,31	-13	27	27,46	0,32	29
1971	7	23	11	12	32,0077	13	32	16,249	0,29	-13	55	10,90	0,35	29
1971	7	23	11	12	40,0080	13	31	48,914	0,47	-14	22	54,97	0,30	29
1971	7	23	11	12	48,0076	13	31	20,938	0,24	-14	50	41,28	0,23	29
1971	9	20	0	13	8,6427	5	55	44,741	0,49	37	38	8,97	0,68	28
1971	9	20	0	13	16,6426	5	57	22,874	0,81	38	9	23,94	1,79	28
1971	9	20	0	13	24,6428	5	59	0,068	0,88	38	39	52,64	0,80	28
1971	9	20	0	13	32,6429	6	0	40,432	1,09	39	10	35,96	1,39	28
1971	9	20	0	13	40,6429	6	2	21,907	1,34	39	41	18,46	1,86	28
1971	9	21	3	23	17,6490	21	37	3,639	0,44	74	43	4,39	0,72	28
1971	9	21	3	23	25,6489	21	28	33,222	0,32	74	50	22,86	0,35	28
1971	9	21	3	23	33,6487	21	20	1,159	0,65	74	56	17,07	0,88	28
1971	9	21	3	23	41,6340	21	11	21,753	0,71	75	1	5,12	0,39	28
1971	9	21	3	23	49,6486	21	2	44,269	0,81	75	4	33,29	0,88	28
1971	9	26	0	24	37,0618	5	7	31,638	0,21	34	51	34,72	0,42	28
1971	9	26	0	24	53,0612	5	10	0,311	0,42	36	6	16,72	0,60	28
1971	9	26	0	25	1,0612	5	11	17,309	0,32	36	43	36,74	0,69	28
1971	9	26	0	25	9,0613	5	12	36,468	0,53	37	20	57,13	1,93	28
1971	9	27	0	32	0,8247	6	20	5,823	0,32	59	5	1,59	0,40	28
1971	9	27	0	32	8,8241	6	23	28,487	0,21	59	35	50,39	0,48	28
1971	9	27	0	32	16,8239	6	26	56,903	0,23	60	6	4,90	0,41	28
1971	9	27	0	32	24,8238	6	30	31,882	0,50	60	35	52,63	0,75	28
1971	9	27	0	32	32,8237	6	34	12,553	0,25	61	5	10,74	0,67	28
1971	10	3	3	40	58,1517	0	38	27,488	0,16	29	29	5,65	0,56	28
1971	10	3	3	41	6,1518	0	37	27,896	0,24	29	58	11,46	0,45	28
1971	10	3	3	41	14,1475	0	36	26,896	0,37	30	27	28,78	0,55	28
1971	10	3	3	41	22,1475	0	35	24,942	0,23	30	56	41,26	1,03	28
1971	10	3	3	41	30,1518	0	34	22,060	0,26	31	25	50,51	0,29	28
1971	10	7	0	54	0,9809	3	47	15,523	1,03	67	45	56,70	0,56	28
1971	10	7	0	54	8,9811	3	48	35,520	0,34	68	29	1,08	0,51	28
1971	10	7	0	54	16,9811	3	50	0,001	0,39	69	11	42,89	0,44	28
1971	10	7	0	54	24,9809	3	51	29,226	0,35	69	54	10,62	0,55	28
1971	10	7	0	54	32,9810	3	53	4,931	0,20	70	36	19,03	0,93	28
1971	10	8	0	52	37,3023	3	14	13,484	0,52	46	34	40,73	0,94	28
1971	10	8	0	52	45,3026	3	14	27,685	0,58	47	23	15,55	1,19	28
1971	10	8	0	52	53,3032	3	14	41,161	0,37	48	8	27,87	2,02	28
1971	10	8	0	53	1,3017	3	14	54,689	0,23	48	55	16,45	2,23	28
1971	10	9	0	56	37,4692	3	1	23,770	0,39	55	49	24,67	1,64	28
1971	10	25	1	48	16,9439	22	11	9,819	1,47	62	35	4,96	1,70	28
1971	10	25	1	48	24,9438	22	7	3,754	0,90	62	51	9,54	0,58	28

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	6	9	20	55	19.9863	16	20	4.500	0.65	-6	56	7.38	1.30	28
1971	6	9	20	55	27.9863	16	20	1.469	0.48	-7	30	2.22	0.81	28
1971	6	16	21	6	39.9978	15	7	56.784	0.32	37	13	1.11	0.88	28
1971	6	16	21	6	43.9977	15	8	9.809	0.63	36	50	14.28	1.03	28
1971	6	16	21	6	47.9976	15	8	21.706	0.44	36	27	26.42	1.04	28
1971	6	17	21	8	0.0035	14	48	59.914	0.54	45	28	38.75	0.66	28
1971	6	17	21	8	4.0036	14	49	21.285	0.56	45	6	24.12	1.16	28
1971	6	17	21	8	8.0036	14	49	42.693	0.54	44	44	9.49	0.41	28
1971	6	17	21	8	12.0035	14	50	3.441	0.78	44	21	50.73	0.50	28
1971	6	17	21	8	16.0035	14	50	23.914	0.51	43	59	32.22	0.29	28
1971	6	17	21	8	20.0036	14	50	44.295	1.17	43	37	11.15	0.30	28
1971	6	17	21	8	24.0036	14	51	4.357	0.96	43	14	41.78	1.39	28
1971	6	17	21	8	27.9989	14	51	23.842	0.99	42	52	20.19	1.19	28
1971	6	17	21	8	35.9996	14	52	2.275	0.48	42	7	22.13	1.02	28
1971	7	8	17	18	0.0038	6	50	19.299	0.31	-49	59	40.40	0.53	29
1971	7	8	17	18	8.0037	6	48	48.026	0.10	-49	42	55.70	0.23	29
1971	7	8	17	18	16.0035	6	47	18.241	0.30	-49	26	9.15	0.25	29
1971	7	8	17	18	24.0036	6	45	49.667	0.16	-49	9	13.56	0.34	29
1971	7	8	17	18	32.0037	6	44	22.116	0.42	-48	52	11.05	0.43	29
1971	7	8	17	18	40.0035	6	42	56.223	0.26	-48	35	9.93	0.33	29
1971	7	8	17	18	48.0035	6	41	31.343	0.29	-48	18	3.61	0.77	29
1971	7	8	17	18	56.0032	6	40	8.056	0.44	-48	0	46.39	0.46	29
1971	7	8	17	19	4.0029	6	38	45.915	0.42	-47	43	28.36	0.59	29
1971	7	8	17	19	12.0031	6	37	24.737	0.47	-47	26	3.29	0.41	29
1971	7	20	11	6	56.0072	13	31	53.905	0.53	-20	53	26.86	0.47	29
1971	7	20	11	7	4.0072	13	31	17.963	0.24	-21	23	49.24	0.42	29
1971	7	20	11	7	12.0071	13	30	41.258	0.41	-21	54	7.08	0.81	29
1971	7	20	11	7	20.0027	13	30	3.861	0.11	-22	24	30.59	0.38	29
1971	7	20	11	7	28.0073	13	29	25.762	0.44	-22	54	52.46	0.43	29
1971	7	20	11	7	36.0081	13	28	46.852	0.21	-23	25	16.66	0.59	29
1971	7	20	11	7	44.0069	13	28	7.514	0.23	-23	55	39.38	0.36	29
1971	7	20	11	7	52.0031	13	27	27.383	0.34	-24	26	2.79	0.36	29
1971	7	20	11	8	0.0071	13	26	46.645	0.33	-24	56	27.56	0.38	29
1971	7	20	11	8	8.0030	13	26	4.970	0.22	-25	26	51.83	0.53	29
1971	7	21	11	8	40.0036	13	32	35.772	0.28	-17	54	58.19	0.47	29
1971	7	21	11	8	48.0096	13	32	3.565	0.29	-18	24	24.90	0.56	29
1971	7	21	11	8	56.0096	13	31	30.823	0.31	-18	53	50.78	0.38	29
1971	7	21	11	9	4.0093	13	30	57.361	0.44	-19	23	21.25	0.53	29
1971	7	21	11	9	12.0096	13	30	23.349	0.41	-19	52	50.48	0.33	29
1971	7	21	11	9	20.0096	13	29	48.628	0.37	-20	22	23.01	0.68	29
1971	7	21	11	9	28.8095	13	29	13.570	0.52	-20	51	54.82	0.37	29
1971	7	23	11	11	44.0076	13	34	50.792	0.20	-11	9	34.09	0.45	29
1971	7	23	11	11	52.0074	13	34	26.245	1.17	-11	37	3.04	0.21	29

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	5	29	20	04	35,9885	17	25	12,035	0,49	-4	55	39,67	1,38	28
1971	5	31	20	02	48,0016	14	9	44,998	0,48	26	14	52,10	0,62	28
1971	5	31	20	02	52,0018	14	10	5,797	0,69	25	57	4,18	2,29	28
1971	6	1	20	18	16,0046	18	16	28,772	0,78	54	12	24,66	0,42	28
1971	6	1	20	18	20,0047	18	15	42,061	0,48	53	57	49,61	0,41	28
1971	6	1	20	18	24,0000	18	14	56,924	0,63	53	43	6,84	1,30	28
1971	6	1	20	18	28,0001	18	14	12,232	0,54	53	28	13,21	0,83	28
1971	6	1	20	18	32,0001	18	13	28,169	0,53	53	13	18,73	0,71	28
1971	6	1	20	18	36,0001	18	12	43,515	0,70	52	58	23,68	0,65	28
1971	6	1	20	18	40,0002	18	11	59,944	0,71	52	43	22,41	0,56	28
1971	6	3	20	00	59,9864	18	53	18,692	0,52	67	1	12,86	1,28	28
1971	6	3	20	01	3,9867	18	51	47,803	0,49	66	49	4,65	1,17	28
1971	6	3	20	01	7,9863	18	50	18,529	0,48	66	36	41,76	0,93	28
1971	6	3	20	01	11,9923	18	48	50,318	0,04	66	24	20,63	0,88	28
1971	6	3	20	01	15,9863	18	47	23,097	0,56	66	11	50,82	1,27	28
1971	6	3	20	01	19,9863	18	45	57,375	0,28	65	59	14,62	0,81	28
1971	6	3	20	01	23,9860	18	44	33,129	0,13	65	46	40,73	1,38	28
1971	6	3	20	01	27,9861	18	43	9,867	0,44	65	33	53,47	1,16	28
1971	6	3	20	01	31,9857	18	41	48,548	0,30	65	21	6,97	1,02	28
1971	6	3	20	01	35,9859	18	40	28,800	1,15	65	8	8,06	1,05	28
1971	6	5	20	41	19,9897	16	51	30,027	0,99	4	47	41,89	1,49	28
1971	6	5	20	41	27,9898	16	51	18,583	0,53	4	12	27,27	1,26	28
1971	6	5	20	41	43,9993	16	50	55,928	0,22	3	1	54,00	1,02	28
1971	6	5	20	41	51,9992	16	50	45,429	0,50	2	27	1,74	1,14	28
1971	6	5	20	41	59,9992	16	50	34,948	0,44	1	52	20,65	0,50	28
1971	6	5	20	42	7,9992	16	50	24,039	0,51	1	17	43,06	1,27	28
1971	6	5	20	42	15,9994	16	50	14,212	0,44	0	43	22,17	0,49	28
1971	6	5	20	42	23,9993	16	50	4,255	0,49	0	9	9,49	0,88	28
1971	6	5	20	42	31,9993	16	49	54,617	0,31	0	24	56,96	0,53	28
1971	6	6	20	43	59,9949	16	44	47,294	0,43	5	37	49,42	0,74	28
1971	6	6	20	44	7,9951	16	44	36,026	0,31	5	1	25,77	0,89	28
1971	6	6	20	44	15,9951	16	44	25,468	0,92	4	25	17,32	0,78	28
1971	6	6	20	44	23,9951	16	44	15,369	0,43	3	49	14,43	0,84	28
1971	6	6	20	44	31,9952	16	44	5,149	0,57	3	13	22,05	0,35	28
1971	6	6	20	44	39,9950	16	43	55,170	0,27	2	37	39,25	1,11	28
1971	6	6	20	44	47,9950	16	43	45,894	0,67	2	2	8,51	1,20	28
1971	6	6	20	44	55,9949	16	43	36,222	0,50	1	27	10,03	1,09	28
1971	6	6	20	45	3,9950	16	43	26,939	0,56	0	51	39,83	0,62	28
1971	6	6	20	45	11,9948	16	43	18,404	0,42	0	16	48,93	0,88	28
1971	6	9	20	54	47,9864	16	20	18,002	0,90	-4	38	0,94	0,37	28
1971	6	9	20	54	55,9864	16	20	14,532	0,71	-5	12	45,71	0,48	28
1971	6	9	20	55	3,9864	16	20	11,094	0,88	-5	47	27,00	0,68	28
1971	6	9	20	55	11,9863	16	20	7,772	0,91	-6	21	53,58	0,91	28

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	5	18	22	39	3,9911	16	6	36,742	0.62	75	10	15,60	0.75	28
1971	5	18	22	39	11,9912	16	6	24,539	0.42	74	41	5,21	0.67	28
1971	5	18	22	39	19,9912	16	6	15,374	0,23	74	11	41,15	0.19	28
1971	5	18	22	39	27,9912	16	6	5,344	0,94	73	42	8,29	0.86	28
1971	5	19	19	33	59,9920	20	51	7,418	0.48	61	59	49,51	1,49	28
1971	5	19	19	34	7,9915	20	48	27,825	0,33	61	49	58,29	0.75	28
1971	5	19	19	34	15,9912	20	45	51.681	0.45	61	39	48.10	0.59	28
1971	5	19	19	34	23,9913	20	43	15,192	0.69	61	29	23.01	1.30	28
1971	5	19	19	34	31,9911	20	40	40,280	0.52	61	18	50,97	0.67	28
1971	5	19	19	34	39,9909	20	38	7,990	0,43	61	7	53,59	0.72	28
1971	5	19	19	34	47,9908	20	35	35,643	0.51	60	56	45.21	0.74	28
1971	5	19	19	34	55,9906	20	33	6,862	0.56	60	45	19,57	0.48	28
1971	5	19	19	35	3,9903	20	30	38,849	0.54	60	33	44.52	0,74	28
1971	5	19	19	35	11,9989	20	28	12,885	0.26	60	21	53,60	0.19	28
1971	5	19	22	38	6,9925	14	47	17,876	0.64	86	36	25,79	2,07	28
1971	5	19	22	38	14,9926	14	54	43,338	0.55	86	11	58.20	0,82	28
1971	5	19	22	38	22,9926	15	0	50.804	0.54	85	47	16.53	0,91	28
1971	5	19	22	38	30,9926	15	5	51,751	0.77	85	22	18,08	0.52	28
1971	5	19	22	38	38,9924	15	10	8,540	0.83	84	57	3,52	0.90	28
1971	5	19	22	38	46,9924	15	13	44,841	0.39	84	31	31,75	0,78	28
1971	5	19	22	38	54,9924	15	16	49,387	0.70	84	5	48,86	1,99	28
1971	5	19	22	39	2,9924	15	19	32,487	1,06	83	39	45,76	2.15	28
1971	5	19	22	39	10,9924	15	21	52,839	0.57	83	13	45,54	0.24	28
1971	5	19	22	39	18,9924	15	24	0,536	0.46	82	47	21.86	0.45	28
1971	5	24	22	59	59,9975	14	50	28,698	0,36	49	9	59,87	0.48	28
1971	5	24	23	0	3,9974	14	50	51,411	0,25	48	51	34,24	0.80	28
1971	5	24	23	0	7,9975	14	51	13,368	0.47	48	33	12,97	0.79	28
1971	5	24	23	0	11,9975	14	51	35,593	0.37	48	14	43.23	0.83	28
1971	5	24	23	0	15,9975	14	51	57,498	0,31	47	56	19,37	0.53	28
1971	5	24	23	0	19,9975	14	52	18,359	0,28	47	37	48,40	0.39	28
1971	5	24	23	0	23,9991	14	52	39,701	0,25	47	19	16,67	0,63	28
1971	5	24	23	0	27,9976	14	53	0,681	0,56	47	0	41.34	1.19	28
1971	5	24	23	0	31,9977	14	53	21,818	0,29	46	42	8,14	0.53	28
1971	5	24	23	0	35,9977	14	53	41,868	0.30	46	23	27,35	0,70	28
1971	5	29	20	23	59,9851	17	25	58,040	0.45	-2	48	45,14	1.36	28
1971	5	29	20	24	3,9851	17	25	52,811	0.32	-3	2	56.09	1.09	28
1971	5	29	20	24	7,9848	17	25	47,599	0.50	-3	16	59,39	0,75	28
1971	5	29	20	24	11,9849	17	25	42,653	0.56	-3	31	11.37	1.79	28
1971	5	29	20	24	15,9847	17	25	37,249	0.85	-3	45	22,74	2,01	28
1971	5	29	20	24	19,9847	17	25	32.265	0,52	-3	59	24.00	1.49	28
1971	5	29	20	24	23,9845	17	25	27.302	0.29	-4	13	32,85	1.27	28
1971	5	29	20	24	27,9843	17	25	21,920	0.47	-4	27	41,76	0.70	28
1971	5	29	20	24	31,9888	17	25	16,761	0,70	-4	41	33,68	0.93	28

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	5	7	22	19	20.0055	18	2	20,654	0,33	54	51	0,29	0,45	28
1971	5	8	1	20	11.0026	13	30	8,852	0,56	49	57	52,20	1,31	28
1971	5	8	1	20	19.0024	13	31	24,272	0,63	49	31	59,20	0,74	28
1971	5	8	1	20	27.0020	13	32	45,982	0,49	49	5	56,10	1.06	28
1971	5	8	1	20	35.0018	13	34	6,230	0,35	48	39	44,56	1,42	28
1971	5	8	1	20	43.0016	13	35	24,753	0,44	48	13	20,39	0,54	28
1971	5	8	1	20	51.0015	13	36	42,011	0,48	47	46	52,92	0,77	28
1971	5	8	1	20	59.0011	13	37	59,060	0,63	47	20	18,91	1,07	28
1971	5	8	1	21	7.0104	13	39	12,502	0,55	46	53	31,45	0,57	28
1971	5	13	1	20	8.0061	10	15	39,085	1,17	65	1	36,96	0.41	28
1971	5	13	1	20	16.0057	10	19	4,386	0,27	64	55	33,64	0,66	28
1971	5	13	1	20	24.0053	10	22	27,468	0,37	64	49	22.76	0,88	28
1971	5	13	1	20	32.0050	10	25	49,979	0,40	64	42	50,47	0,98	28
1971	5	13	1	20	40.0051	10	29	11,265	0,25	64	35	58,57	0,47	28
1971	5	13	1	20	48.0048	10	32	32,386	0,39	64	28	45,49	0,13	28
1971	5	13	1	20	56.0043	10	35	51,687	0,34	64	21	9,60	0,74	28
1971	5	13	1	21	4.0041	10	39	9,928	0,17	64	13	9,17	1,25	28
1971	5	13	1	21	12.0041	10	42	26,526	0,39	64	4	50,70	0.96	28
1971	5	13	1	21	20.0041	10	45	41,932	0,49	63	56	9,03	0,93	28
1971	5	17	22	35	44.9984	16	39	3,962	0,80	78	17	29,03	0.54	28
1971	5	17	22	35	52.9983	16	37	44,000	0,40	77	49	53,12	0,92	28
1971	5	17	22	36	0.9982	16	36	29,440	0,68	77	22	16,55	1.07	28
1971	5	17	22	36	8.9984	16	35	21,987	0,79	76	54	24,18	1,04	28
1971	5	17	22	36	16.9981	16	34	18,296	0,70	76	26	21,45	0,83	28
1971	5	17	22	36	24.9981	16	33	16,766	0,54	75	58	7,35	0,83	28
1971	5	17	22	36	32.9980	16	32	22,569	0,34	75	29	46,03	1,08	28
1971	5	17	22	36	40.9981	16	31	29,630	0,43	75	1	6,03	1,25	28
1971	5	18	18	34	7.9970	20	1	56,787	0,31	57	18	43,77	0,72	28
1971	5	18	18	34	15.9967	19	59	54,886	0,24	57	4	16,88	0,34	28
1971	5	18	18	34	23.9966	19	57	56,146	0,30	56	49	44,16	0,85	28
1971	5	18	18	34	31.9965	19	55	57,639	0,41	56	34	54,99	0,95	28
1971	5	18	18	34	39.9964	19	54	0,791	0,34	56	19	56,83	0,81	28
1971	5	18	18	34	47.9962	19	52	6,043	0,32	56	4	44,45	0,44	28
1971	5	18	18	34	55.9960	19	50	11,557	0,32	55	49	22,77	0,50	28
1971	5	18	18	35	3.9959	19	48	19,546	0,32	55	33	48,88	0,66	28
1971	5	18	18	35	11.9957	19	46	28,672	0,34	55	18	4,58	1.61	28
1971	5	18	22	38	7.9824	16	8	17,756	0,86	78	30	7,98	0,25	28
1971	5	18	22	38	15.9823	16	7	58,895	1,27	78	2	5,02	1,59	28
1971	5	18	22	38	23.9824	16	7	43,254	0,17	77	33	47,47	0,59	28
1971	5	18	22	38	31.9824	16	7	26,922	0,24	77	5	26,05	0,97	28
1971	5	18	22	38	39.9824	16	7	13,880	0,74	76	36	47,86	0,86	28
1971	5	18	22	38	47.9912	16	6	58,868	0,28	76	8	13,73	0,32	28
1971	5	18	22	38	55.9911	16	6	47,668	1,16	75	39	20,36	0.64	28

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	4	19	0	53	36,9780	16	17	21,981	0,56	69	30	28,82	0.99	28
1971	4	24	22	15	24,0104	17	54	10,805	0,74	4	5	29,49	0.86	28
1971	4	24	22	15	32,0106	17	54	0,300	0.76	3	42	50,32	0.82	28
1971	4	24	22	15	40,0106	17	53	58,340	0,95	3	20	10,35	1.05	28
1971	4	24	22	15	48,0105	17	53	41,089	0.64	2	57	36,99	0.48	28
1971	4	24	22	15	56,0106	17	53	31,839	0,65	2	34	59,58	0.49	28
1971	4	24	22	16	4,0106	17	53	22,869	0,44	2	12	26,10	0.84	28
1971	4	24	22	16	12,0106	17	53	14,830	0.43	1	49	54,44	1.00	28
1971	4	24	22	16	20,0106	17	53	5,490	1,03	1	27	23,96	0.47	28
1971	4	30	1	4	8,0101	13	39	55,910	0.68	68	19	51,11	1.13	28
1971	4	30	1	4	16,0098	13	42	20,558	0.36	67	56	46,97	0.65	28
1971	4	30	1	4	24,0184	13	44	41,546	0.36	67	33	26,33	0.59	28
1971	4	30	1	4	32,0182	13	46	57,300	0.33	67	9	48,55	0.68	28
1971	4	30	1	4	40,0182	13	49	9,819	0.44	66	45	59,88	0.64	28
1971	4	30	1	4	48,0176	13	51	19,979	0.30	66	22	1,98	1.15	28
1971	4	30	1	4	56,0176	13	53	23,332	0.54	65	57	42,68	1.13	28
1971	4	30	1	5	4,0174	13	55	24,496	0,40	65	33	10.29	1.29	28
1971	4	30	1	5	12,0173	13	57	22,900	0.48	65	8	31,72	1,49	28
1971	4	30	1	5	20,0172	13	59	16,975	0.14	64	43	35,84	0.86	28
1971	5	6	22	16	4,0083	18	22	42,323	1,15	58	43	41,00	0.71	28
1971	5	6	22	16	8,0084	18	21	56,243	0.96	58	31	27,05	0.97	28
1971	5	6	22	16	12,0085	18	21	12,542	0,92	58	18	58,74	0.23	28
1971	5	6	22	16	16,0085	18	20	29,303	0.89	58	6	31,76	1,22	28
1971	5	6	22	16	20,0085	18	19	47,252	0.96	57	53	57,14	0.64	28
1971	5	6	22	16	24,0085	18	19	4,154	1,25	57	41	27,82	0.75	28
1971	5	6	22	16	28,0086	18	18	22,889	0,52	57	28	51.10	0.88	28
1971	5	6	22	16	32,0042	18	17	41,606	0.75	57	16	13,81	1.02	28
1971	5	7	1	21	5,0066	13	58	53,877	0.35	41	41	45,95	0.53	28
1971	5	7	1	21	13,0061	13	59	51,504	0.48	41	13	4,72	0.75	28
1971	5	7	1	21	21,0061	14	0	47,152	0.77	40	44	22,44	1.18	28
1971	5	7	1	21	29,0061	14	1	43,503	0.46	40	15	29,94	1.21	28
1971	5	7	1	21	37,0058	14	2	39,182	0,40	39	46	29,63	1.95	28
1971	5	7	1	21	45,0059	14	3	33,855	0.82	39	17	29,32	0.46	28
1971	5	7	1	21	53,0058	14	4	25,876	0,40	38	48	27,81	0.25	28
1971	5	7	22	18	8,0051	18	13	53,526	1,28	58	47	51.55	1.23	28
1971	5	7	22	18	16,0054	18	12	28,973	0.51	58	22	11,41	1,72	28
1971	5	7	22	18	24,0143	18	11	6,277	1.05	57	56	21,67	0.73	28
1971	5	7	22	18	32,0143	18	9	46,228	0,46	57	30	18,48	0.57	28
1971	5	7	22	18	40,0145	18	8	27,508	0,47	57	4	10,35	0.56	28
1971	5	7	22	18	48,0146	18	7	10,736	0,20	56	37	51,46	1.00	28
1971	5	7	22	18	56,0061	18	5	55,703	0.40	56	11	17,96	0.58	28
1971	5	7	22	19	4,0062	18	4	41.749	0.51	55	44	39,20	0.51	28
1971	5	7	22	19	12,0065	18	3	29,951	0,50	55	17	55,33	0.96	28

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	4	5	16	26	8,0054	16	29	3,777	0,18	2	17	6,18	0,57	29
1971	4	5	16	26	24,0061	16	29	7,125	0,18	1	16	5,92	0,59	29
1971	4	5	16	26	32,0062	16	29	8,616	0,32	0	45	8,80	0,40	29
1971	4	5	16	26	40,0064	16	29	10,394	0.35	0	13	59,71	0,30	29
1971	4	5	16	26	56,0065	16	29	13,874	0,25	0	49	8,65	0,33	29
1971	4	5	16	27	4,0067	16	29	15,283	0.28	-1	21	14,12	0,45	29
1971	4	5	16	27	12,0068	16	29	17,180	0,21	-1	53	32,69	0,51	29
1971	4	5	16	27	20,0069	16	29	18,595	0,35	-2	26	3,18	0,46	29
1971	4	7	16	27	28,0020	16	18	4,023	0,31	2	35	53,05	0,49	29
1971	4	7	16	27	36,0023	16	18	2,622	0,37	2	5	30,40	0,34	29
1971	4	7	16	27	44,0022	16	18	0,866	0,38	1	34	50,63	0.40	29
1971	4	7	16	27	52,0025	16	17	59,377	0,52	1	3	56,49	0,31	29
1971	4	7	16	28	0,0025	16	17	57,834	0,32	0	32	44,29	0,61	29
1971	4	7	16	28	8,0026	16	17	56,267	0,41	0	1	16,12	1,08	29
1971	4	7	16	28	16,0029	16	17	54,563	0,20	0	30	26,36	0,41	29
1971	4	7	16	28	24,0029	16	17	52,768	0,28	-1	2	31,78	0,28	29
1971	4	7	16	28	32,0033	16	17	50,643	0,40	-1	34	50,68	0,58	29
1971	4	7	16	28	40,0034	16	17	48,675	0,26	-2	7	30,22	0,27	29
1971	4	12	0	55	48,0164	17	3	55,311	0,75	39	40	31,37	0,69	28
1971	4	12	0	57	8,0168	17	1	27,139	0,63	34	49	32,30	0,49	28
1971	4	12	0	57	24,0174	17	1	0,998	0,63	33	50	51,90	0,88	28
1971	4	12	0	57	24,0174	17	1	0,998	0.63	33	50	51,90	0,88	28
1971	4	12	0	57	40,0180	17	0	35,360	0,59	32	52	14,65	0,73	28
1971	4	12	0	57	56,0188	17	0	11,314	0,94	31	53	31,60	0,68	28
1971	4	12	0	58	12,0194	16	59	47,699	0,39	30	54	46,78	0.68	28
1971	4	15	0	44	48,0042	18	13	36,095	0,61	81	3	57,13	0.34	28
1971	4	15	0	45	4,0042	18	5	17,886	0,32	80	23	40,00	0.47	28
1971	4	15	0	45	20,0046	17	58	4,829	0,25	79	42	12,15	0,35	28
1971	4	15	0	45	36,0048	17	51	40,974	0,50	79	0	4,78	0,97	28
1971	4	15	0	46	52,0053	17	46	4,231	0,45	78	16	51,49	0,55	28
1971	4	15	21	41	47,2210	20	38	32,482	0,70	60	56	49,88	0,42	28
1971	4	15	21	42	3,2209	20	34	20,727	0,68	60	36	33,71	0,87	28
1971	4	15	21	42	19,2209	20	30	13,453	0,93	60	15	33,65	0,95	28
1971	4	15	21	42	35,2207	20	26	11,837	0.80	59	53	58,72	0,55	28
1971	4	19	0	52	24,9767	16	17	58,105	0,58	73	22	32.48	1,06	28
1971	4	19	0	52	32,9771	16	17	53,362	0,59	72	57	13,25	0,77	28
1971	4	19	0	52	40,9772	16	17	48,857	0,38	72	31	38,46	0,46	28
1971	4	19	0	52	48,9772	16	17	44,001	0,44	72	6	5,91	0,76	28
1971	4	19	0	52	56,9773	16	17	39,671	0,58	71	40	25,09	1,23	28
1971	4	19	0	53	4,9775	16	17	35,221	0,46	71	14	38,91	0,33	28
1971	4	19	0	53	12,9774	16	17	31,487	0,70	70	48	46,38	1,39	28
1971	4	19	0	53	20,9774	16	17	28,230	0,43	70	22	50,31	0,83	28
1971	4	19	0	53	28,9777	16	17	24,714	0,63	69	56	43,72	0,58	28

SATELLITE 1967 014 A DIADEME 2 SDC NUMBER 2680

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	7	18	20	4	35,9986	18	31	40,985	0,88	22	34	42,01	0,51	28
1971	7	18	20	4	39,9986	18	34	57,802	0,53	22	41	10,94	0,66	28
1971	7	18	21	58	20,0537	16	31	45,712	0,56	29	30	13,18	0,78	28
1971	7	18	21	58	47,9925	16	54	12,066	0,70	31	11	46,94	0,44	28
1971	7	18	21	58	51,9925	16	57	40,338	0,70	31	25	59,12	0,39	28
1971	7	21	20	19	32,0292	16	50	0,310	1,70	20	16	45,17	0,86	28
1971	7	23	20	58	22,4563	14	37	25,154	0,51	26	18	55,65	0,63	28
1971	7	23	20	58	26,4519	14	39	32,270	1,13	26	31	17,56	0,57	28
1971	7	23	20	58	30,4519	14	41	36,778	0,67	26	43	18,19	0,87	28
1971	7	23	20	58	34,4519	14	43	44,225	1,18	26	55	15,77	1,11	28
1971	7	26	20	31	29,8882	20	21	23,505	1,00	17	33	31,26	0,75	28
1971	7	26	20	31	33,8883	20	23	42,033	0,92	17	15	30,72	0,77	28
1971	7	27	20	20	23,9964	20	24	10,162	1,14	13	44	35,74	2,02	28
1971	7	27	20	20	32,0003	20	28	16,868	0,36	13	9	48,02	0,98	28
1971	7	28	9	5	30,6906	13	31	45,395	0,27	74	20	40,62	1,10	31
1971	7	28	9	5	46,6903	13	47	42,297	0,63	75	33	21,56	1,48	31
1971	7	28	9	5	54,6903	13	56	43,913	1,20	76	8	43,30	2,02	31
1971	7	28	9	6	2,6899	14	6	36,255	1,37	76	43	12,30	0,57	31
1971	10	31	11	4	42,4410	1	5	23,807	0,45	-23	45	21,32	0,70	29
1971	10	31	11	4	50,4409	1	12	0,639	0,88	-23	51	29,09	0,47	29
1971	10	31	11	4	58,4408	1	18	39,055	1,05	-23	56	29,85	0,57	29
1971	10	31	11	5	6,4412	1	25	17,875	0,86	-24	0	6,60	0,65	29
1971	10	31	11	5	14,4412	1	31	57,317	0,41	-24	2	32,58	0,32	29
1971	11	3	12	22	55,4046	23	14	6,911	0,93	-17	40	35,83	0,64	29
1971	11	14	3	40	47,7504	8	56	56,483	1,57	20	13	57,10	0,51	28
1971	11	14	3	41	13,7532	9	44	17,681	1,67	21	20	39,49	0,77	28
1971	12	7	17	11	36,0627	1	32	9,100	0,76	0	49	58,64	1,27	28
1971	12	7	17	11	44,0532	1	36	26,446	1,46	0	15	19,19	1,78	28
1971	12	7	17	11	51,9805	1	40	53,012	2,47	0	17	33,21	1,53	28
1971	12	7	17	12	0,0639	1	45	21,319	0,72	0	43	43,61	1,55	28
1971	12	17	4	25	59,6506	21	57	13,489	1,46	37	7	5,60	0,86	30
1971	12	23	13	8	18,9606	9	35	59,896	0,79	8	48	9,36	0,84	29
1971	12	23	13	8	26,9606	9	40	12,740	0,35	8	23	4,87	1,29	29
1971	12	23	13	8	34,9607	9	44	24,041	0,95	7	58	12,66	1,23	29
1971	12	23	13	8	42,9606	9	48	35,651	0,78	7	33	38,45	0,96	29
1971	12	23	13	8	50,9603	9	52	46,075	0,52	7	9	17,78	0,53	29

SATELLITE 1967 014 A   DIADEME 2   SDC NUMBER 2680

DATE						R.A.1950.0			RMS	DECL.1950.0			RMS	STATION
YEAR	MO	DA	HR	MIN	SEC	HR	MIN	SEC		DEG	MIN	SEC		
1971	4	30	[illegible]	44	21,9009	8	37	42,061	0,51	19	29	22,37	0,49	29
1971	5	6	21	47	15,9998	12	42	20,580	1,73	15	43	44,23	2,29	28
1971	5	6	21	47	17,9998	12	44	1,294	1,05	15	53	6,02	2,38	28
1971	5	14	[illegible]	35	24,2819	14	5	49,950	1,82	46	57	4,95	1,39	30
1971	5	14	[illegible]	35	40,2812	14	28	40,883	1,83	46	28	52,07	1,76	30
1971	5	14	[illegible]	35	56,2885	14	51	43,276	1,64	45	42	53,04	1,63	30
1971	5	18	6	49	25,8159	13	34	54,565	1,34	35	58	28,59	0,81	30
1971	5	18	6	50	17,8198	14	26	0,001	1,05	32	41	54,66	0,80	30
1971	5	18	6	50	33,8336	14	42	37,081	1,68	31	15	52,25	1,32	30
1971	5	20	6	56	57,7487	13	43	36,052	1,03	27	52	22,86	0,78	30
1971	5	20	6	57	13,7574	13	58	23,233	1,80	26	34	41,71	1,02	30
1971	7	15	22	33	31,9986	17	24	36,578	0,86	28	5	51,99	0,47	28
1971	7	15	22	33	36,0028	17	28	5,437	0,36	28	22	39,62	0,18	28
1971	7	15	22	33	39,9984	17	31	38,512	1,36	28	39	16,03	1,11	28
1971	7	15	22	33	43,9985	17	35	16,565	0,68	28	55	49,10	0,27	28
1971	7	15	22	33	47,9985	17	38	56,997	1,50	29	12	7,55	1,61	28
1971	7	15	22	33	47,9986	17	39	1,299	0,68	29	12	25,00	0,81	28
1971	7	15	22	33	51,9985	17	42	45,965	1,63	29	28	33,80	1,07	28
1971	7	15	22	33	51,9985	17	42	45,965	1,63	29	28	33,80	1,07	28
1971	7	15	22	33	55,9986	17	46	33,583	0,32	29	44	17,42	0,58	28
1971	7	15	22	33	59,9987	17	50	25,116	0,32	29	59	46,64	0,30	28
1971	7	15	22	34	2,9989	17	58	21,690	0,59	30	30	6,46	0,53	28
1971	7	15	22	34	3,9988	17	54	21,665	0,64	30	15	2,52	1,37	28
1971	7	17	8	17	6,9962	17	12	55,250	0,85	23	3	47,29	0,79	28
1971	7	17	8	17	11,0004	17	15	19,919	1,31	23	10	24,93	0,79	28
1971	7	17	8	17	14,9961	17	17	48,828	0,52	23	16	59,59	0,65	28
1971	7	17	8	17	19,0005	17	20	28,462	1,05	23	23	22,75	0,58	28
1971	7	17	2	13	39,5673	18	55	14,942	0,75	3	6	38,98	0,66	28
1971	7	17	2	13	43,5674	18	57	29,558	1,05	2	52	33,54	0,64	28
1971	7	17	2	13	47,5675	18	59	44,162	0,89	2	38	10,06	1,11	28
1971	7	17	2	13	51,5676	19	2	0,371	1,19	2	23	29,80	1,48	28
1971	7	17	2	13	55,5634	19	4	16,234	0,58	2	8	31,27	1,08	28
1971	7	17	[illegible]	10	4,9430	12	7	37,129	0,82	0	13	40,22	0,87	31
1971	7	17	[illegible]	10	12,9427	12	10	7,135	0,52	0	28	38,04	0,37	31
1971	7	17	[illegible]	10	20,9426	12	12	38,082	0,39	1	11	47,92	0,63	31
1971	7	18	20	4	4,0035	18	5	24,486	0,57	21	30	50,86	0,74	28
1971	7	18	20	4	8,0035	18	8	41,808	1,09	21	39	50,23	0,77	28
1971	7	18	20	4	12,0033	18	11	57,634	0,21	21	48	40,99	0,87	28
1971	7	18	20	4	16,0033	18	15	16,292	1,75	21	57	11,12	0,73	28
1971	7	18	20	4	20,0031	18	18	32,056	0,78	22	5	14,99	0,92	28
1971	7	18	20	4	24,0031	18	21	51,493	1,45	22	13	8,41	1,19	28
1971	7	18	20	4	28,0031	18	25	7,147	0,67	22	20	33,97	0,47	28
1971	7	18	20	4	31,9987	18	28	24,135	0,50	22	27	39,66	0,74	28

SATELLITE 1967 014 A DIADEME 2 SDC NUMBER 2680

DATE YEAR	MO	DA	HR	MIN	SEC	R,A,1950,0 HR	MIN	SEC	RMS	DECL,1950,0 DEG	MIN	SEC	RMS	STATION
1971	1	10	2	47	55,2647	22	18	1,296	0,74	39	8	45,45	0,71	30
1971	1	10	2	48	11,2647	22	27	54,451	0,99	39	51	20,37	0.72	30
1971	1	10	2	48	27,2647	22	38	21,020	0,50	40	32	18,46	0,61	30
1971	1	10	2	48	43,2644	22	49	24,602	0,89	41	11	6,13	0.75	30
1971	1	10	2	48	59,2644	23	1	5,232	0,47	41	47	9,31	1.14	30
1971	1	11	2	36	31,8598	22	16	48,084	0,60	38	37	27,48	0,98	30
1971	1	11	2	36	47,8597	22	27	1,102	1,06	39	13	53,03	0,92	30
1971	1	11	2	37	3,8592	22	37	45,819	0,63	39	48	3,69	1,01	30
1971	1	13	2	12	28,3061	21	29	48,636	0,55	34	31	27,99	0,73	30
1971	1	13	2	12	44,3060	21	38	20,279	0,59	35	3	20,05	0,72	30
1971	1	13	2	13	0,3059	21	47	14,925	0,43	35	33	39,25	0,69	30
1971	1	13	2	13	16,3060	21	56	37,437	0,57	36	2	35,69	0,51	30
1971	1	13	2	13	32,3063	22	6	27,352	0,69	36	29	27,62	0,90	30
1971	1	13	2	21	49,3060	4	19	10,018	0,51	11	49	57,26	0,51	30
1971	1	16	0	36	54,6578	23	37	46,791	0,35	3	37	48,74	0,92	30
1971	1	16	3	36	6,6551	23	18	22,156	0,42	6	3	53,41	0,64	30
1971	1	16	3	36	22,6553	23	24	45,269	0,62	5	17	18,35	1,34	30
1971	1	16	3	36	38,6563	23	31	13,428	0,52	4	28	39,94	0,75	30
1971	1	19	3	1	31,3710	22	51	17,713	0,36	0	4	2,70	0,93	30
1971	2	28	3	49	55,7952	8	27	19,908	0,46	-3	40	47,94	0,43	30
1971	2	28	3	49	59,7954	8	29	46,683	0,45	-3	22	7,52	0,49	30
1971	3	2	3	24	42,0484	6	36	12,521	1,07	-7	39	4,30	1,19	30
1971	3	2	3	25	14,0483	6	54	58,240	0,61	-5	9	47,55	0,56	30
1971	3	2	3	25	30,0479	7	4	37,482	1,10	-3	53	51,53	0,75	30
1971	3	2	3	25	46,0495	7	14	24,976	0,60	-2	37	27,01	0,93	30
1971	3	3	3	14	19,2398	7	1	46,860	1,08	1	4	42,51	1,50	30
1971	3	3	3	14	35,2423	7	12	1,074	1,10	2	21	40,61	1,62	30
1971	3	4	3	6	0,3285	8	56	38,020	0,52	17	11	46,95	0,97	30
1971	3	4	3	6	16,3165	9	7	1,408	1,55	17	51	54,32	1,28	30
1971	3	4	3	6	32,3108	9	17	13,190	1,05	18	28	2,77	0,29	30
1971	3	4	3	6	48,3360	9	27	12,257	1,08	19	0	15,34	0,45	30
1971	3	4	3	7	4,3032	9	36	59,442	0,20	19	28	43,07	0,77	30
1971	3	7	4	24	56,7699	5	40	28,520	0,84	43	19	14,41	0,95	30
1971	3	8	4	10	23,3710	3	37	49,835	0,95	26	47	31,38	2,55	30
1971	3	8	4	10	39,3664	3	44	24,521	1,46	28	14	20,60	0,90	30
1971	3	8	4	10	55,3617	3	51	24,838	1,46	29	43	39,41	3,42	30
1971	3	8	4	11	11,3562	3	58	53,049	0,57	31	15	13,38	0,97	30
1971	4	28	8	4	56,4929	7	52	34,024	0,64	7	26	46,43	0,43	29
1971	4	28	10	38	3,0791	18	50	57,534	0,92	65	50	3,59	0,75	30
1971	4	29	7	49	29,6482	5	55	43,495	0,60	-1	31	56,22	0,56	29
1971	4	29	7	55	59,0693	8	52	5,113	0,50	17	48	38,29	0,52	29
1971	4	29	7	56	7,0692	8	55	31,245	0,38	18	13	23,27	0,68	29
1971	4	29	7	56	15,0695	8	58	56,345	1,20	18	37	51,65	0,67	29

SATELLITE 1967 011 A DIADEME 1 SDC NUMBER 2674

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950,0 HR	MIN	SEC	RMS	DECL.1950,0 DEG	MIN	SEC	RMS	STATION
1971	6	14	18	42	47,4833	18	59	13,730	1,16	61	21	40,04	0,83	30
1971	6	15	7	1	30,5884	16	42	30,353	0,44	-25	59	21,02	1,29	31
1971	6	15	7	1	38,5884	16	46	31,378	1,06	-24	46	32,23	0,85	31
1971	6	15	7	2	2,5879	16	58	9,617	0,97	-21	11	25,02	1,65	31
1971	6	15	7	46	22,2939	16	45	58,753	1,55	26	45	44,06	0,57	30
1971	6	15	20	53	34,6866	17	2	23,742	1,83	20	58	18,01	1,44	28
1971	6	15	22	53	36,6893	17	4	35,774	0,39	21	9	0,33	2,07	28
1971	6	15	22	53	38,6933	17	6	48,709	1,46	21	19	31,63	1.82	28
1971	6	15	22	53	42,7012	17	11	18,465	1,13	21	40	31,19	0,66	28
1971	6	16	0	5	4,5810	12	36	34,195	0,51	38	10	31,18	0,89	31
1971	6	16	14	42	5,4296	1	36	24,560	0,26	82	37	12,35	0,78	31
1971	6	16	14	42	21,4324	1	48	17,385	0,78	80	20	33,52	0,63	31
1971	6	16	14	42	29,4332	1	52	38,872	0,47	79	11	19,27	0,80	31
1971	6	23	23	3	28,0175	18	47	14,180	1,69	20	33	55,52	1,18	28
1971	6	23	23	3	30,0153	18	49	26,753	0,70	20	23	26,29	0,86	28
1971	6	25	15	7	28,3214	19	21	34,632	0,40	-19	35	11,58	0.54	31
1971	8	11	0	54	0,0042	2	10	31,597	1,07	14	15	31,12	1,05	28
1971	8	11	0	54	8,0037	2	16	28,954	0,43	14	27	50.94	1.27	28
1971	8	11	0	54	40,0026	2	39	4,145	4,05	15	5	16,29	0,63	28
1971	8	11	0	54	48,0039	2	44	23,057	1,11	15	12	4,40	1,02	28
1971	8	11	0	54	56,0030	2	49	35,688	0,40	15	17	43,55	0,71	28
1971	8	11	0	55	12,0036	2	59	40,944	1,05	15	26	32,51	1,07	28
1971	8	29	19	50	28,7637	20	55	39,967	0,34	34	57	34,67	0,80	28
1971	8	29	19	50	32,7638	21	2	29,955	0,42	34	38	37,27	0,75	28
1971	8	29	19	50	36,7639	21	9	7,774	1,03	34	18	36,91	0.40	28
1971	8	29	19	50	40,7687	21	15	35,443	0,49	33	57	37,66	0.45	28
1971	10	21	1	44	2,5530	7	29	9,556	0,41	3	18	1,89	0,92	28
1971	10	21	1	44	6,5579	7	31	19,420	0,61	2	57	49,39	0,70	28
1971	10	21	1	44	10,5580	7	33	30,826	0,38	2	39	46,42	0,84	28
1971	10	21	1	44	14,5576	7	35	41,635	0,72	2	24	27,47	0,37	28
1971	12	16	11	52	30,9798	13	46	20,938	1,35	38	51	25,09	5,43	30
1971	12	18	3	51	25,1698	11	17	8,480	0,58	18	32	12,57	0,65	28
1971	12	18	3	51	45,1657	11	32	44,539	1,38	16	59	54,54	1,02	28
1971	12	18	3	51	53,1660	11	40	12,103	1,57	16	13	13.12	0.87	28
1971	12	18	3	52	1,1663	11	47	25,285	0,95	15	26	28.43	1.08	28

SATELLITE 1967 011 A DIADEME 1 SDC NUMBER 2674

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	4	1	7	46	8,5710	5	25	47,364	0,81	-15	12	54,92	0,58	29
1971	4	5	8	47	19,6452	7	27	29,485	0,55	13	15	23,03	0,58	29
1971	4	5	8	47	27,7165	7	34	14,651	0,52	13	50	5,21	0,40	29
1971	4	5	8	47	35,7166	7	40	54,809	0,79	14	24	13,28	0,73	29
1971	4	5	8	47	51,7160	7	54	8,217	0,32	15	31	18,92	0,57	29
1971	4	7	7	29	30,3312	8	26	11,189	0,47	16	16	59,25	0,59	29
1971	4	7	7	29	38,3339	8	32	47,185	0,80	16	42	1,76	0,40	29
1971	4	7	7	29	50,3338	8	42	22,168	0,73	17	18	5,16	0,38	29
1971	4	7	7	29	58,3337	8	48	33,463	0,79	17	41	3,77	0,68	29
1971	4	7	11	39	32,9240	13	30	20,694	1,50	53	28	30,97	0,73	30
1971	4	7	11	39	48,9217	13	51	27,384	1,80	56	23	35,46	0,59	30
1971	4	8	10	7	18,4896	18	14	49,404	1,38	50	24	13,60	0,78	30
1971	4	8	10	7	26,4911	18	26	33,259	1,56	49	46	0,39	2,13	30
1971	4	12	0	40	16,3733	18	17	40,417	0,68	29	34	34,39	0,80	28
1971	4	13	2	41	4,0041	14	18	27,709	1,50	23	2	43,96	1.43	28
1971	4	13	2	41	8,0041	14	22	29,299	1,53	23	2	21,60	0,92	28
1971	4	13	2	41	10,0042	14	24	29,543	0,71	23	2	17,74	0,49	28
1971	4	13	2	41	6,0041	14	20	31,535	1,25	23	2	20,03	1.20	28
1971	4	13	11	20	5,4891	14	29	50,852	0,96	52	11	45,19	1.13	30
1971	4	13	11	20	21,4896	14	57	37,030	1,39	52	55	38,72	0,39	30
1971	4	13	11	20	37,4894	15	27	33,304	1,38	53	16	5,70	0.47	30
1971	4	15	11	50	46,8900	15	49	21,546	1,94	24	12	42,59	1.94	30
1971	4	16	12	4	30,3965	14	38	5,839	1,43	14	5	33,39	1.04	30
1971	4	16	12	4	46,4007	14	51	39,564	0,46	12	52	48,80	0,28	30
1971	4	16	12	5	18,4119	15	20	14,688	1,16	10	2	12,34	1,34	30
1971	6	8	9	13	36,7153	19	16	9,988	0,58	10	32	27,45	0,90	30
1971	6	8	9	13	44,9890	19	26	26,963	1,10	11	40	23,93	1,16	30
1971	6	8	9	13	52,9923	19	34	30,708	0,49	12	31	48,63	0,67	30
1971	6	11	23	47	17,5161	20	45	57,099	1,00	19	8	17,01	0,64	28
1971	6	11	23	47	21,5161	20	49	44,874	1,35	19	14	0,08	0,52	28
1971	6	11	23	47	25,5163	20	53	29,602	1,36	19	19	18,86	0,93	28
1971	6	11	23	47	29,5162	20	57	12,519	1,41	19	24	12,69	0.77	28
1971	6	11	23	47	33,5162	21	0	54,696	1,10	19	28	41,39	0,98	28
1971	6	12	0	23	37,4723	19	24	23,973	1,31	33	38	3,49	0.44	30
1971	6	13	0	2	4,0028	21	0	4,001	0,98	26	57	11,51	2.40	28
1971	6	13	0	2	8,0027	21	4	24,296	0.92	26	58	11,21	0.97	28
1971	6	13	0	2	12,0032	21	8	25,934	0,61	26	51	21,88	0.75	28
1971	6	13	0	2	16,0031	21	12	32,395	0,59	26	47	36,41	1,05	28
1971	6	13	0	2	20,0030	21	16	35,151	1,08	26	43	39,75	0.86	28
1971	6	13	0	2	24,0030	21	20	34,894	1,07	26	39	0,13	0,95	28
1971	6	13	0	2	28,0030	21	24	31,282	1,58	26	34	9,76	0.72	28
1971	6	13	0	2	32,0030	21	28	23,957	1,51	26	28	53,83	2,03	28
1971	6	13	0	2	36,0030	21	32	13,617	0,87	26	23	8,03	1.10	28

SATELLITE 1966 110 B ATS-B/RCK BDY SDC NUMBER 2609

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	6	16	6	58	24,0068	12	56	29,197	0,47	14	4	10,04	0.53	29
1971	6	16	6	58	32,0065	12	27	51,949	0,38	-10	5	33,46	0.76	31
1971	6	16	6	58	40,0065	12	57	3,618	0,28	14	9	14,53	0,30	29
1971	6	16	6	58	48,0069	12	28	29,194	0,68	-9	58	56,73	0,63	31
1971	6	16	6	58	56,0070	12	57	38,216	0,51	14	14	18,76	0.98	29
1971	6	16	6	59	4,0067	12	29	6,958	0,38	-9	52	18,95	0,38	31
1971	6	16	6	59	12,0069	12	58	12,741	0,39	14	19	20,86	0,62	29
1971	6	16	6	59	28,0073	12	58	47,211	0,45	14	24	26,52	1,01	29
1971	6	16	6	59	36,0066	12	30	21,860	0,97	-9	39	3,68	1.25	31
1971	6	16	6	59	44,0073	12	59	21,786	0,39	14	29	35,13	0,82	29
1971	6	16	6	59	52,0067	12	30	59,216	0,58	-9	32	26,83	0,71	31
1971	6	16	7	0	0,0065	12	31	36,349	0,62	-9	25	55,11	0,29	31
1971	6	16	7	0	16,0078	13	0	31,106	0,63	14	39	40,33	0,92	29
1971	6	16	7	0	24,0066	12	32	13,994	0,63	-9	19	17,14	0,44	31
1971	6	16	7	0	32,0069	13	1	5,187	0,54	14	44	49,38	0,62	29
1971	6	16	7	0	42,0066	12	32	51,448	0,50	-9	12	39,56	0,60	31
1971	6	16	7	0	48,0067	13	1	39,628	0,38	14	49	53,78	1,09	29
1971	6	16	7	0	56,0060	12	33	28,453	0,46	-9	6	8,05	0,72	31
1971	8	15	6	43	24,5694	19	33	5,355	0,51	0	36	29,69	0.76	32

SATELLITE 1964 056 B PAGEOS-A/RCK BDY SDC NUMBER 2255

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	9	20	14	6	0,0046	21	17	52,103	0,26	-22	33	21,95	0,67	29
1971	9	20	14	6	7,9934	23	21	27,208	0,31	-48	22	2,39	0,22	40
1971	9	20	14	6	8,0044	21	17	17,398	0,26	-23	1	27,66	0,73	29
1971	9	20	14	6	15,9932	23	21	33,358	0,55	-48	59	40,73	0,96	40
1971	9	20	14	6	16,0043	21	16	42,453	0,22	-23	29	33,13	0,74	29
1971	9	20	14	6	23,9930	23	21	39,390	0,43	-49	37	9,36	0,81	40
1971	9	20	14	6	24,0042	21	16	6,737	0,28	-23	57	39,38	0,67	29
1971	9	20	14	6	31,9927	23	21	45,811	0,28	-50	14	31,66	0,85	40
1971	9	20	14	6	32,0040	21	15	30,585	0,50	-24	25	54,34	0,43	29
1971	9	20	14	6	40,0039	21	14	53,665	0,56	-24	54	7,59	0,51	29
1971	9	30	12	43	27,9941	0	20	11,016	0,66	-41	35	57,22	0,61	40
1971	9	30	12	43	35,9942	0	20	48,286	0,73	-42	12	21,69	1,96	40
1971	9	30	12	43	43,9944	0	21	26,410	0,37	-42	48	41,34	1,09	40
1971	9	30	12	43	51,9942	0	22	5,901	0,10	-43	25	4,26	3,21	40
1971	9	30	12	43	59,9939	0	22	45,477	1,09	-44	1	4,04	2,48	40
1971	9	30	12	44	7,9940	0	23	26,648	0,34	-44	37	6,57	2,68	40
1971	9	30	12	44	15,9938	0	24	8,541	0,61	-45	12	47,69	1.06	40
1971	9	30	12	44	31,9932	0	25	35,568	0,20	-46	24	28,37	1,13	40
1971	10	12	11	31	59,9957	0	2	45,939	0,52	1	27	59,38	0,87	40
1971	10	12	11	32	7,9958	0	2	56,331	0,48	0	56	32,20	0,84	40
1971	10	12	11	32	15,9999	0	3	6,923	0,26	0	24	58,48	0,59	40
1971	10	12	11	32	23,9956	0	3	17,581	0,33	0	6	43,88	0,36	40
1971	10	12	11	32	31,9953	0	3	28,606	0,16	0	38	35,42	0,90	40
1971	10	12	11	32	39,9954	0	3	39,939	0,39	-1	10	35,06	0,70	40
1971	10	12	11	32	47,9951	0	3	51,240	0,32	-1	42	43,14	0,27	40
1971	10	12	11	32	55,9949	0	4	3,096	0,43	-2	15	2,07	0,42	40
1971	10	12	11	33	3,9947	0	4	15,042	0,17	-2	47	28,12	0,41	40
1971	10	12	11	33	11,9946	0	4	27,320	0,37	-3	19	59,50	0,80	40
1971	10	31	11	52	15,9908	21	46	7,060	0,42	-54	40	42,99	0,50	40
1971	10	31	11	52	31,9907	21	44	24,609	0,19	-55	47	53,27	0,35	40
1971	10	31	11	52	39,9907	21	43	31,033	0,12	-56	21	13,72	1,13	40
1971	10	31	11	52	47,9908	21	42	36,250	0,41	-56	54	21,88	0,74	40
1971	10	31	11	52	55,9908	21	41	39,717	0,24	-57	27	18,28	0,76	40
1971	10	31	11	53	3,9907	21	40	41,104	0,46	-58	0	10,63	1,27	40
1971	10	31	11	53	11,9906	21	39	41,016	0,17	-58	32	47,21	0,24	40
1971	10	31	11	53	19,9905	21	38	39,092	0,26	-59	5	13,79	0,77	40

SATELLITE 1964 056 B PAGEOS-A/RCK BDY SDC NUMBER 2255

DATE YEAR	MO	DA	HR	MIN	SEC	R.A. 1950.0 HR	MIN	SEC	RMS	DECL. 1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	11	16	34	8,0080	21	32	22,361	0,27	-33	54	36,81	0,93	29
1971	8	11	16	34	11,9928	0	35	8,018	0,30	-57	55	21,58	1,60	40
1971	8	11	16	34	16,0078	21	31	34,129	0,37	-34	25	48,23	0,80	29
1971	8	11	16	34	19,9926	0	36	5,219	0,41	-58	29	37,19	2,13	40
1971	8	11	16	34	24,0080	21	30	44,922	0,59	-34	57	4,07	0,55	29
1971	8	11	16	34	27,9926	0	37	3,469	0,95	-59	3	36,23	0,94	40
1971	8	11	16	34	32,0078	21	29	54,957	0,41	-35	28	19,10	1,08	29
1971	8	11	16	34	35,9925	0	38	4,084	0,48	-59	37	23,96	1,76	40
1971	8	11	16	34	40,0076	21	29	3,726	0,37	-35	59	29,05	1,40	29
1971	8	11	16	34	43,9925	0	39	6,248	0,54	-60	11	2,78	1,33	40
1971	8	11	16	34	48,0076	21	28	11,711	0,33	-36	30	39,38	0,62	29
1971	8	11	16	34	51,9922	0	40	10,240	0,39	-60	44	30,50	1,15	40
1971	8	11	16	34	56,0074	21	27	18,681	0,59	-37	1	48,99	0,82	29
1971	8	11	16	34	59,9921	0	41	16,532	0,69	-61	17	41,34	1,42	40
1971	8	11	16	35	4,0074	21	26	24,317	0,56	-37	32	52,88	1,40	29
1971	8	11	16	35	7,9919	0	42	25,491	1,13	-61	50	37,95	1,56	40
1971	8	11	16	35	12,0068	21	25	28,886	0,63	-38	3	59,49	0,99	29
1971	9	6	14	52	47,9998	21	1	59,682	0,40	-42	10	37,61	1,04	29
1971	9	6	14	52	47,9987	0	27	9,353	1,23	-68	9	44,15	1,19	40
1971	9	6	14	52	55,9906	0	28	33,097	0,93	-68	40	45,35	0,83	40
1971	9	6	14	52	55,9996	21	0	51,490	0,53	-42	40	7,57	0,82	29
1971	9	6	14	53	3,9907	0	29	59,354	0,36	-69	11	33,22	0,97	40
1971	9	6	14	53	3,9998	20	59	42,746	0,36	-43	9	41,47	0,79	29
1971	9	6	14	53	11,9985	0	31	31,736	0,38	-69	42	7,56	1,52	40
1971	9	6	14	53	11,9996	20	58	31,715	0,58	-43	39	1,00	0,77	29
1971	9	6	14	53	19,9996	20	57	19,474	0,44	-44	8	15,74	0,81	29
1971	9	6	14	53	27,9984	0	34	45,976	0,92	-70	42	31,21	1,01	40
1971	9	6	14	53	27,9995	20	56	5,873	0,52	-44	37	28,42	0,82	29
1971	9	6	14	53	35,9981	0	36	31,213	1,20	-71	12	25,05	1,21	40
1971	9	6	14	53	35,9983	20	54	58,503	0,65	-45	6	34,82	0,69	29
1971	9	6	14	53	43,9980	0	38	20,690	0,59	-71	42	3,39	0,36	40
1971	9	6	14	53	43,9991	20	53	33,968	0,32	-45	35	38,03	0,33	29
1971	9	6	14	53	51,9898	0	40	16,312	0,27	-72	11	24,18	0,92	40
1971	9	6	14	53	51,9989	20	52	15,815	0,59	-46	4	30,00	0,89	29
1971	9	6	14	53	59,9899	0	42	16,437	0,44	-72	40	31,26	0,80	40
1971	9	6	14	53	59,9980	20	50	55,571	0,54	-46	33	17,39	0,85	29
1971	9	20	14	5	36,0046	21	19	31,967	0,30	-21	9	18,70	0,26	29
1971	9	20	14	5	43,9937	23	21	5,024	0,35	-45	50	21,01	0,63	40
1971	9	20	14	5	43,9933	23	21	10,545	0,30	-46	28	28,69	0,45	40
1971	9	20	14	5	44,0048	21	18	59,347	0,38	-21	37	19,73	0,77	29
1971	9	20	14	5	51,9934	23	21	15,940	0,30	-47	6	24,16	0,85	40
1971	9	20	14	5	52,0043	21	18	25,940	0,43	-22	5	17,94	0,88	29
1971	9	20	14	5	59,9934	23	21	21,422	0,19	-47	44	16,23	0,48	40

SATELLITE 1966 056 B PAGEOS-A/RCK BDY SDC NUMBER 2255

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	7	15	17	57	35.9992	0	36	45.050	0.46	-8	28	13.82	2.00	40
1971	7	15	17	57	43.9989	0	37	0.117	0.56	-9	2	54.30	0.71	40
1971	7	15	17	57	51.9988	0	37	15.722	0.59	-9	37	46.16	1.29	40
1971	7	15	17	57	59.9986	0	37	31.095	0.55	-10	12	40.79	1.10	40
1971	8	2	18	3	27.9931	22	47	38.592	0.26	-47	40	50.29	0.90	40
1971	8	2	18	3	28.0049	21	24	20.161	0.52	-21	0	9.14	0.61	29
1971	8	2	18	3	35.9931	22	47	13.348	0.43	-48	18	0.63	0.39	40
1971	8	2	18	3	36.0050	21	23	46.105	0.47	-21	26	0.32	0.68	29
1971	8	2	18	3	43.9929	22	46	47.269	0.42	-48	55	6.44	0.58	40
1971	8	2	18	3	44.0049	21	23	11.495	0.47	-21	51	48.83	0.79	29
1971	8	2	18	3	52.0050	21	22	36.178	0.27	-22	17	43.83	0.45	29
1971	8	2	18	3	59.9929	22	45	53.551	0.21	-50	8	55.41	0.45	40
1971	8	2	18	4	0.0050	21	22	0.414	0.27	-22	43	37.42	0.85	29
1971	8	2	18	4	7.9929	22	45	25.636	0.36	-50	45	37.44	0.44	40
1971	8	2	18	4	15.9927	22	44	56.763	0.37	-51	22	10.89	1.10	40
1971	8	2	18	4	23.9927	22	44	27.355	0.25	-51	58	37.59	1.48	40
1971	8	2	18	4	31.9927	22	43	57.870	0.74	-52	34	48.64	1.45	40
1971	8	2	18	4	32.0044	21	19	31.690	0.55	-24	27	26.45	0.75	29
1971	8	2	18	4	39.9925	22	43	25.952	0.67	-53	10	54.74	1.07	40
1971	8	2	18	4	40.0043	21	18	53.062	0.25	-24	53	24.70	0.81	29
1971	8	2	18	4	47.9926	22	42	53.804	0.21	-53	46	48.09	1.65	40
1971	8	10	16	24	15.9878	1	2	21.115	0.28	-56	17	42.04	0.68	40
1971	8	10	16	24	16.0044	21	42	8.044	0.88	-35	44	47.05	1.43	29
1971	8	10	16	24	23.9877	1	3	34.481	0.48	-56	50	46.56	0.42	40
1971	8	10	16	24	24.0041	21	41	28.311	0.53	-36	17	34.03	1.16	29
1971	8	10	16	24	31.9873	1	4	49.904	0.43	-57	23	38.56	0.77	40
1971	8	10	16	24	32.0041	21	40	31.502	0.37	-36	50	20.54	0.87	29
1971	8	10	16	24	39.9871	1	6	7.827	0.42	-57	56	21.11	0.59	40
1971	8	10	16	24	47.9871	1	7	27.558	0.26	-58	28	47.36	0.92	40
1971	8	10	16	24	55.9872	1	8	50.245	0.47	-59	1	1.35	0.88	40
1971	8	10	16	24	56.0104	21	37	59.215	0.33	-38	28	29.92	0.33	29
1971	8	10	16	25	4.0036	21	37	6.415	0.38	-39	1	10.68	0.72	29
1971	8	10	16	25	11.9868	1	11	42.111	0.49	-60	4	50.93	0.68	40
1971	8	10	16	25	11.9876	1	10	14.568	0.54	-59	33	2.88	0.64	40
1971	8	10	16	25	12.0034	21	36	12.410	0.54	-39	33	46.01	1.01	29
1971	8	10	16	25	19.9866	1	13	12.453	0.57	-60	36	27.92	1.27	40
1971	8	10	16	25	20.0031	21	35	17.195	0.19	-40	6	25.38	0.69	29
1971	8	10	16	25	27.9864	1	14	45.012	0.28	-61	7	47.48	1.38	40
1971	8	10	16	25	28.0030	21	34	20.745	0.53	-40	38	59.19	0.82	29
1971	8	10	16	25	35.9859	1	16	21.134	0.66	-61	38	55.14	1.23	40
1971	8	11	16	33	55.9931	0	33	19.809	0.46	-56	46	27.00	0.87	40
1971	8	11	16	34	0.0081	21	33	9.601	0.31	-33	23	19.60	0.72	29
1971	8	11	16	34	3.9929	0	34	13.810	0.30	-57	20	57.74	0.96	40

SATELLITE 1964 056 B   PAGEOS-A/RCK BDY   SDC NUMBER 2255

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	4	26	11	37	52,0018	9	17	16,198	0,28	-50	25	24,39	0,60	29
1971	4	26	11	37	52,0031	13	59	19,893	0.19	-70	52	42,94	0,95	40
1971	4	26	11	37	59,9938	9	19	0,914	0,32	-49	54	54,85	0,66	29
1971	4	26	11	38	0,0031	13	56	36,885	0,23	-70	26	15,18	0.93	40
1971	4	29	12	6	24,0024	8	37	17,703	0,41	-48	14	38,65	1,13	29
1971	4	29	12	6	32,0027	8	39	11,397	1,18	-47	49	31,28	1,29	29
1971	4	29	12	6	40,0027	8	41	2,614	0,68	-47	24	17,30	0,88	29
1971	4	29	12	6	48,0027	8	42	51,956	0,50	-46	58	49,34	1,37	29
1971	4	29	12	6	56,0025	8	44	39,248	0,70	-46	33	12,30	1,54	29
1971	4	29	12	7	4,0012	8	46	24,810	0,80	-46	7	26,27	0,61	29
1971	4	29	12	7	12,0022	8	48	8,961	0,51	-45	41	38,79	1,07	29
1971	4	29	12	7	20,0022	8	49	50,065	0,78	-45	15	26,60	0,72	29
1971	4	29	12	7	36,0014	8	53	8,329	0,55	-44	22	58,71	0,85	29
1971	4	29	12	7	44,0009	8	54	44,340	0,60	-43	56	29,20	0,95	29
1971	6	29	18	29	3,9852	2	10	15,889	0,65	-43	49	9,98	0,88	40
1971	6	29	18	29	3,9991	22	56	0,183	0,40	-35	44	15,28	0,36	29
1971	6	29	18	29	11,9991	22	55	37,957	0,37	-36	22	36,07	0,40	29
1971	6	29	18	29	19,9851	2	11	30,875	0,44	-44	18	32,60	0,66	40
1971	6	29	18	29	19,9993	22	55	15,064	0,13	-37	0	56,51	0,30	29
1971	6	29	18	29	27,9851	2	12	47,525	0,62	-44	47	53,58	0,37	40
1971	6	29	18	29	27,9995	22	54	51,548	0,39	-37	39	21,77	0,59	29
1971	6	29	18	29	35,9851	2	14	5,077	0,62	-45	16	57,92	0,52	40
1971	6	29	18	29	35,9994	22	54	27,221	0,67	-38	17	44,83	1,13	29
1971	6	29	18	29	43,9850	2	15	24,415	0,50	-45	45	56,98	0,88	40
1971	6	29	18	29	43,9994	22	54	2,883	0,23	-38	56	12,87	0,69	29
1971	6	29	18	29	51,9845	2	16	45,775	0,41	-46	14	52,48	0.45	40
1971	6	29	18	29	51,9996	22	53	37,559	0,35	-39	34	39,40	1,06	29
1971	6	29	18	29	59,9847	2	18	7,839	0,29	-46	43	31,28	0,81	40
1971	6	29	18	29	59,9997	22	53	11,629	0,59	-40	13	11,44	1,40	29
1971	6	29	18	30	7,9845	2	19	31,959	0,60	-47	12	3,38	0,74	40
1971	6	29	18	30	7,9998	22	52	44,968	0,50	-40	55	8,83	0,48	29
1971	6	29	18	30	15,9841	2	20	57,492	0,53	-47	40	24,13	0,74	40
1971	6	29	18	30	15,9996	22	52	17,842	0,27	-41	30	8,03	0,37	29
1971	6	29	18	30	23,9846	2	22	24,848	0,51	-48	8	35,42	0,65	40
1971	6	29	18	30	39,9840	2	23	54,806	0,59	-48	36	40,52	0,74	40
1971	7	15	17	56	32,0002	0	34	54,123	0,48	-3	55	37,09	1,51	40
1971	7	15	17	56	40,0002	0	35	6,733	0,68	-4	29	10,78	1,59	40
1971	7	15	17	56	48,0001	0	35	20,073	0,61	-5	3	0,90	1,58	40
1971	7	15	17	56	56,0001	0	35	33,425	0,27	-5	36	49,46	0.54	40
1971	7	15	17	57	3,9999	0	35	47,217	0,77	-6	10	50,04	2,19	40
1971	7	15	17	57	11,9997	0	36	1,365	0,67	-6	44	58,43	2,13	40
1971	7	15	17	57	19,9997	0	36	15,409	0,57	-7	19	16,45	2,06	40
1971	7	15	17	57	27,9996	0	36	29,988	0,74	-7	53	45,19	1.45	40

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	3	27	9	48	29,0994	20	55	2,971	0,93	58	52	56,06	0,89	30
1971	3	27	9	49	1,1062	21	33	25,798	1,42	63	2	12,67	0,94	30
1971	3	28	18	8	17,3942	21	58	33,828	1,51	71	24	7,78	1,88	30
1971	4	2	16	53	47,6625	20	23	50,852	0,33	-30	1	16,92	0,63	29
1971	4	3	17	9	49,4867	23	29	16,978	0,53	-55	29	59,99	0,44	29
1971	4	3	17	9	49,4867	23	29	16,847	0,67	-55	29	59,83	0,51	29
1971	4	3	17	10	9,4836	23	10	7,849	0,77	-55	21	49,38	0,63	29
1971	4	3	17	10	9,4836	23	10	7,849	0,77	-55	21	49,38	0,63	29
1971	4	3	17	10	9,4934	23	10	8,026	0,83	-55	21	49,85	0,58	29
1971	4	3	17	16	18,4182	18	3	54,489	0,43	2	28	2,78	1,10	29
1971	4	4	18	27	2,9974	19	1	39,932	0,49	4	15	59,98	2,13	30
1971	4	4	18	27	19,0180	19	2	40,108	0,84	7	32	55,48	1,66	30
1971	4	4	18	27	35,0145	19	3	53,358	0,43	11	2	12,77	1,24	30
1971	4	4	18	27	50,9682	19	5	23,890	0,56	14	44	12,65	2,45	30
1971	4	4	12	17	5,2014	14	24	13,396	0,40	-18	39	43,13	2,16	30
1971	4	4	12	17	37,1922	14	10	53,119	0,36	-13	37	45,02	1,78	30
1971	4	5	18	46	4,3075	18	31	34,861	0,35	-1	12	5,42	1,67	30
1971	4	5	18	46	20,3082	18	30	44,648	1,13	2	17	18,86	0,79	30
1971	4	5	18	46	36,3108	18	29	57,337	0,43	6	3	46,25	1,63	30
1971	4	5	18	46	52,3147	18	29	12,908	0,75	10	8	2,17	2,68	30
1971	4	5	18	47	8,3285	18	28	32,234	0,52	14	30	26,42	2,45	30
1971	4	5	16	2	57,2293	20	24	28,459	0,47	0	53	40,65	0,62	29
1971	4	5	16	3	5,2296	20	21	27,977	0,47	1	49	50,85	0,45	29
1971	4	5	16	3	17,2299	20	17	12,675	0,38	3	16	5,07	1,42	29
1971	4	5	17	48	28,9570	0	28	43,428	0,79	-72	13	25,12	0,90	29
1971	4	5	17	48	36,9560	0	13	8,488	0,43	-72	41	22,04	0,57	29
1971	4	6	14	45	11,1186	18	54	58,648	0,65	-6	0	43,93	2,41	31
1971	4	6	14	45	15,1191	18	54	13,145	0,62	-4	59	42,53	1,52	31
1971	4	6	14	45	19,1164	18	53	27,423	0,59	-3	57	29,03	0,94	31
1971	4	6	14	45	23,1182	18	52	41,501	0,89	-2	54	6,02	0,79	31
1971	4	6	14	45	27,1182	18	51	55,231	0,53	-1	49	42,29	2,09	31
1971	4	6	16	23	4,0303	19	59	17,112	0,51	5	52	26,94	1,38	29
1971	4	6	16	23	24,0290	19	52	6,115	0,33	8	31	46,54	0,53	29
1971	4	7	2	8	25,8694	14	24	10,469	0,69	60	41	58,77	0,59	28
1971	4	7	2	8	29,8696	14	16	23,354	0,72	61	37	50,60	0,86	28
1971	4	7	2	8	33,8688	14	8	14,103	0,37	62	31	14,51	1,04	28
1971	4	7	2	8	37,8702	13	59	45,585	1,12	63	21	48,52	1,40	28
1971	4	7	2	8	41,8705	13	50	56,444	0,68	64	9	22,22	0,58	28
1971	4	7	16	36	25,6544	23	11	15,781	0,40	-39	19	40,34	0,72	29
1971	4	7	16	42	33,2932	19	40	47,504	0,69	6	25	37,54	0,90	29
1971	4	7	16	42	45,2927	19	36	0,863	0,56	8	8	45,32	0,99	29
1971	4	8	11	44	13,7690	15	52	54,027	0,33	-5	59	35,64	1,48	30
1971	4	8	11	44	21,7689	15	48	34,082	0,55	-4	4	38,93	1,67	30

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	4	9	12	2	25.8072	15	40	33.163	1.00	-20	9	57.84	2.20	30
1971	4	9	12	2	41.8042	15	33	20.255	0.84	-17	25	10.77	1.74	30
1971	4	10	16	0	53.6670	15	19	58.026	1.02	-33	25	0.16	2.05	31
1971	4	10	16	0	57.6668	15	18	35.336	0.97	-32	42	7.46	2.30	31
1971	4	10	16	1	1.6667	15	17	12.809	0.78	-31	58	43.38	2.08	31
1971	4	10	16	1	17.6661	15	11	39.284	1.17	-28	59	44.31	1.47	31
1971	4	10	17	37	8.1691	20	21	45.782	0.52	-44	48	28.64	0.91	29
1971	4	10	17	37	16.1691	20	13	28.159	0.24	-43	5	57.98	0.34	29
1971	4	10	17	37	24.1695	20	5	32.226	0.48	-41	19	41.39	0.88	29
1971	4	10	17	37	32.1693	19	57	57.895	0.44	-39	30	3.00	0.51	29
1971	4	10	17	39	55.2860	18	27	36.302	0.50	-5	6	46.20	0.98	29
1971	4	10	17	40	3.2861	18	24	17.930	0.37	-3	26	26.10	0.89	29
1971	4	10	17	40	11.2864	18	21	6.866	0.48	-1	48	49.02	0.85	29
1971	4	10	17	40	19.2651	18	18	2.319	0.32	0	13	55.35	0.66	29
1971	4	12	1	54	44.8001	16	58	2.278	0.63	82	18	54.75	1.56	28
1971	4	12	1	54	52.8087	16	24	51.652	0.87	84	12	27.21	0.73	28
1971	4	19	2	18	59.8898	13	10	32.538	0.58	77	46	35.53	0.50	28
1971	4	19	2	19	3.8894	12	52	39.727	0.26	77	51	26.42	0.61	28
1971	4	19	2	19	7.8899	12	35	0.151	0.46	77	52	8.12	0.72	28
1971	4	19	2	19	11.8904	12	17	50.311	0.35	77	48	44.67	0.78	28
1971	4	19	2	19	15.8902	12	1	16.142	0.50	77	41	37.11	0.56	28
1971	4	25	2	24	19.8980	11	6	53.362	0.29	79	54	58.98	0.52	28
1971	4	25	2	24	23.8981	10	52	45.139	0.30	79	27	24.21	0.52	28
1971	4	27	18	30	59.7501	23	27	53.568	0.93	52	24	37.65	1.93	30
1971	4	29	11	8	38.8287	22	19	47.466	0.60	56	47	4.96	0.86	30
1971	4	29	18	9	54.4760	23	45	19.780	0.68	-57	11	2.78	0.90	29
1971	4	29	18	10	2.4761	23	32	23.104	0.32	-56	11	20.98	0.16	29
1971	4	29	18	10	10.4759	23	19	43.450	0.19	-55	4	18.43	0.44	29
1971	4	29	18	13	12.3682	20	23	6.520	0.22	-10	5	48.15	0.95	29
1971	4	29	18	13	28.3805	20	14	54.799	0.59	-6	9	41.65	0.59	29
1971	4	29	18	13	36.3810	20	11	11.045	0.82	-4	17	34.71	1.28	29
1971	4	29	18	13	44.3815	20	7	36.490	0.33	-2	29	1.17	0.36	29
1971	4	30	2	3	59.8855	20	55	28.539	0.37	-3	16	57.77	0.81	28
1971	4	30	2	4	3.8898	20	55	27.070	0.42	-2	35	56.75	0.86	28
1971	4	30	2	4	7.8853	20	55	25.411	0.60	-1	54	10.57	0.59	28
1971	4	30	2	4	11.8853	20	55	24.918	0.61	-1	11	43.32	0.48	28
1971	4	30	2	4	15.8851	20	55	23.875	0.35	0	28	27.13	0.50	28
1971	4	30	2	4	19.8853	20	55	23.459	0.70	0	15	38.41	0.57	28
1971	4	30	2	4	23.8851	20	55	24.214	0.45	1	0	38.13	0.42	28
1971	4	30	2	9	59.8985	3	53	11.054	0.34	83	29	18.88	0.78	28
1971	4	30	2	10	3.8985	4	17	51.598	0.18	83	10	25.92	0.68	28
1971	4	30	2	10	7.8984	4	39	45.036	0.19	82	47	41.49	0.67	28
1971	4	30	2	10	11.8985	4	58	57.061	0.17	82	21	54.62	1.19	28

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1971	4	30	2	10	15,8984	5	15	43,858	0,20	81	53	39,79	0,47	28
1971	4	30	2	10	19,8984	5	30	17,147	0,25	81	23	46,96	0,73	28
1971	4	30	2	10	23,8986	5	42	59,024	0,28	80	52	34,37	0,73	28
1971	5	15	17	49	17,6861	23	33	21,753	0,27	4	3	32,78	0,69	29
1971	5	15	17	49	25,6888	23	29	17,548	0,52	5	22	58,64	0,85	29
1971	5	16	18	8	42,1074	23	5	43,162	0,30	3	43	21,55	0,37	29
1971	5	16	18	8	50,1953	23	1	23,707	0,56	5	13	8,69	1,19	29
1971	5	16	18	8	58,1951	22	57	13,988	0,26	6	39	52,23	1,16	29
1971	5	16	18	9	6,1954	22	53	11,435	0,48	8	4	33,28	1,61	29
1971	5	17	0	24	1,0847	2	15	11,869	1,28	-48	19	43,47	2,04	29
1971	5	17	0	24	9,0835	2	5	3,015	1,54	-47	31	50,22	2,56	29
1971	5	17	0	24	17,0834	1	54	53,706	0,29	-46	38	27,98	1,67	29
1971	5	17	18	27	43,7813	22	40	9,430	0,40	-1	43	38,43	0,37	29
1971	5	17	18	27	59,7806	22	31	18,242	0,36	1	43	56,77	1,94	29
1971	6	9	6	44	23,4029	6	34	22,969	1,25	-26	24	53,41	1,80	29
1971	6	9	6	44	26,1330	6	45	23,045	0,46	-24	22	36,38	0,85	29
1971	6	9	6	44	34,4046	6	39	49,577	0,89	-25	25	33,33	0,96	29
1971	6	9	6	44	50,3944	6	28	42,416	0,62	-27	18	45,53	1,23	29
1971	6	11	7	22	2,7216	7	15	21,740	0,48	-9	10	31,03	1,00	29
1971	6	11	7	22	10,7214	7	11	46,742	0,97	-10	4	40,89	0,83	29
1971	6	11	7	22	22,7213	7	6	21,507	0,44	-11	24	39,75	1,20	29
1971	6	11	7	22	30,7203	7	2	41,537	0,41	-12	17	15,73	1,12	29
1971	6	11	7	22	38,7209	6	58	59,551	1,29	-13	9	12,76	2,19	29
1971	6	14	6	29	59,7955	7	28	0,455	0,19	-32	12	32,06	0,81	29
1971	6	14	6	30	7,8176	7	20	53,130	0,42	-33	25	48,92	0,66	29
1971	6	14	6	30	15,8176	7	13	39,200	0,37	-34	35	58,80	1,19	29
1971	6	14	6	30	23,8176	7	6	18,449	0,78	-35	43	7,94	1,68	29
1971	6	14	6	30	31,8172	6	58	51,935	0,22	-36	46	55,78	0,24	29
1971	6	16	6	46	22,6010	9	2	4,554	0,69	37	6	0,21	0,72	31
1971	6	16	6	46	26,6018	9	2	35,594	0,34	36	20	19,35	0,79	31
1971	6	16	6	46	30,6017	9	2	43,553	0,47	35	37	48,27	0,57	31
1971	6	16	6	46	34,6017	9	2	58,875	0,48	34	55	12,98	0,58	31
1971	6	16	6	46	38,6016	9	2	56,179	0,32	34	12	31,55	0,63	31
1971	6	20	6	33	50,0717	8	56	48,174	0,76	-22	59	15,64	1,45	29
1971	6	20	6	33	58,0717	8	50	21,625	0,39	-24	35	16,16	1,32	29
1971	6	20	6	34	6,0714	8	43	44,821	0,38	-26	9	40,55	0,67	29
1971	6	20	6	34	14,0712	8	36	55,805	0,44	-27	42	17,98	0,91	29
1971	6	20	18	15	44,7924	4	16	39,435	0,56	-8	15	7,26	0,96	29
1971	6	20	18	15	52,7922	4	12	54,635	0,37	-7	17	1,41	0,59	29
1971	7	20	6	53	11,6975	8	23	23,906	0,54	60	22	30,21	0,38	32
1971	7	28	7	20	29,8724	14	27	11,460	0,23	54	40	39,70	0,33	31
1971	7	28	7	20	33,8724	14	26	0,581	0,40	53	44	51,56	0,78	31
1971	7	31	6	42	41,3695	16	14	41,627	0,54	-16	31	50,03	0,62	29

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1971	7	31	6	42	49.3696	16	12	34.036	0.47	-18	56	2.96	0.61	29
1971	8	10	8	9	34.8197	13	16	21.129	0.59	-16	55	48.63	0.66	29
1971	8	10	8	9	42.8192	13	10	7.089	0.33	-18	30	8.62	0.14	29
1971	8	10	8	9	50.8187	13	3	45.148	0.17	-20	2	57.06	0.75	29
1971	8	12	6	37	27.0787	20	43	43.947	0.63	26	12	2.38	0.64	31
1971	8	12	6	37	35.0785	20	40	1.161	0.15	24	45	25.11	0.40	31
1971	8	12	6	37	39.0784	20	38	10.249	0.16	24	0	54.59	0.87	31
1971	8	12	6	37	43.0782	20	36	19.766	1.44	23	15	25.29	1.14	31
1971	8	13	6	56	32.2932	20	21	17.086	0.24	37	35	47.18	0.35	31
1971	8	13	6	56	36.2932	20	18	43.919	0.50	36	50	19.72	0.45	31
1971	8	14	20	13	59.9376	14	46	13.149	0.12	62	16	25.91	0.35	28
1971	8	14	20	14	3.9303	14	50	55.295	0.27	60	14	22.07	0.76	28
1971	8	14	20	14	3.9488	14	48	38.935	0.32	61	15	44.35	0.47	28
1971	8	14	20	14	11.9295	14	53	3.552	0.25	59	12	30.44	0.36	28
1971	8	14	20	14	15.9469	14	55	3.999	0.35	58	9	58.13	0.27	28
1971	8	14	20	14	19.9464	14	56	57.133	0.34	57	7	0.95	0.33	28
1971	8	14	20	14	23.9465	14	58	43.866	0.27	56	3	32.37	0.67	28
1971	8	16	19	5	3.9162	19	2	21.782	0.40	0	15	46.78	0.24	28
1971	8	16	19	5	7.9156	19	0	16.539	0.33	0	37	6.07	0.25	28
1971	8	16	19	5	11.9110	18	58	12.983	0.46	-1	29	17.74	0.34	28
1971	8	16	19	5	15.9153	18	56	11.898	0.19	-2	20	51.78	0.58	28
1971	8	16	19	5	19.9153	18	54	12.886	0.10	-3	11	40.47	1.37	28
1971	8	16	19	5	23.9152	18	52	15.516	0.32	-4	1	47.35	0.48	28
1971	8	17	19	20	3.9030	22	48	4.465	0.50	62	8	38.47	0.25	28
1971	8	17	19	20	7.9031	22	41	11.610	0.33	61	53	45.66	0.22	28
1971	8	17	19	20	11.9031	22	34	17.724	0.34	61	37	17.36	0.27	28
1971	8	17	19	20	15.8991	22	27	24.279	0.33	61	19	8.18	0.29	28
1971	8	17	19	20	19.8989	22	20	31.485	0.51	60	59	2.69	0.40	28
1971	8	17	19	20	23.8991	22	13	39.454	0.29	60	37	32.00	0.84	28
1971	8	18	19	39	11.9013	22	44	39.818	0.28	74	32	50.45	0.72	28
1971	8	18	19	39	15.9034	22	32	4.431	0.40	74	23	23.79	0.65	28
1971	8	18	19	39	19.9047	22	19	30.527	0.26	74	11	7.71	0.59	28
1971	8	18	19	39	23.9048	22	7	3.289	0.12	73	55	47.72	0.28	28
1971	8	19	20	0	11.9031	17	10	29.999	0.36	57	41	32.65	0.65	28
1971	8	19	20	0	15.9033	17	9	14.345	0.31	56	24	36.92	0.93	28
1971	8	19	20	0	19.9031	17	8	3.039	0.31	55	7	4.47	1.17	28
1971	8	21	7	39	51.7759	18	46	31.751	0.65	53	56	9.09	1.18	31
1971	8	21	20	37	59.9076	14	40	28.688	0.24	58	16	53.57	0.64	28
1971	8	21	20	38	3.9075	14	43	37.522	0.58	57	22	40.95	0.29	28
1971	8	21	20	38	7.9069	14	46	37.520	0.14	56	27	47.40	0.32	28
1971	8	21	20	38	11.9067	14	49	28.657	0.39	55	32	17.02	0.57	28
1971	8	21	20	38	15.9021	14	52	11.947	0.32	54	36	23.05	0.41	28
1971	8	21	20	38	19.9018	14	54	47.526	0.51	53	39	42.56	1.07	28

SATELLITE 1968 002 A GEOS-B SDC NUMBER 3093

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	8	21	20	38	23,9020	14	57	16,068	0,31	52	42	45,56	0,41	28
1971	8	22	19	9	59,9058	19	45	19,210	0,24	-3	16	51,78	0,51	28
1971	8	22	19	10	3,9021	19	43	13,959	0,68	-4	6	57,75	0,74	28
1971	8	22	19	10	7,9015	19	41	11,556	0,33	-4	56	28,07	0,43	28
1971	8	22	19	10	15,9060	19	37	9,526	0,41	-6	33	22,47	0,46	28
1971	8	22	19	10	19,9060	19	35	11,839	0,20	-7	20	49,91	0,37	28
1971	8	22	19	10	23,9059	19	33	15,720	0,33	-8	7	34,74	0,46	28
1971	8	22	20	57	59,8982	14	48	43,429	1,59	42	41	23,44	0,54	28
1971	8	22	20	58	3,8981	14	50	38,010	2,79	41	51	49,40	1,63	28
1971	8	22	20	58	7,8980	14	52	29,091	0,18	41	2	37,64	0,51	28
1971	8	22	20	58	11,8978	14	54	16,454	0,36	40	12	59,20	0,35	28
1971	8	22	20	58	15,8976	14	56	0,459	0,42	39	23	22,70	0,42	28
1971	8	22	20	58	19,8976	14	57	41,002	0,33	38	33	41,57	0,42	28
1971	8	22	20	58	23,9022	14	59	18,407	0,21	37	44	3,32	0,35	28
1971	8	25	7	20	43,0963	18	45	24,200	0,52	-15	38	54,43	0,91	29
1971	8	25	7	20	51,0964	18	43	48,003	0,64	-17	54	1,74	1,34	29
1971	8	25	7	21	11,0957	18	39	1,026	0,93	-23	52	32,90	0,85	29
1971	8	27	7	44	54,1582	19	40	47,948	1,28	47	54	11,89	0,08	31
1971	8	27	7	44	58,1579	19	37	30,167	0,41	46	50	22,62	1,82	31
1971	8	27	7	45	2,1579	19	34	15,564	0,56	45	44	35,30	0,93	31
1971	8	28	19	14	59,9003	20	24	44,632	0,26	-7	31	4,10	0,21	28
1971	8	28	19	15	3,9004	20	22	43,144	0,38	-8	17	27,09	0,67	28
1971	8	28	19	15	7,9007	20	20	43,476	0,35	-9	3	14,64	0.42	28
1971	8	28	19	15	11,9007	20	18	45,510	0,16	-9	48	23,41	0,35	28
1971	8	28	19	15	15,9007	20	16	49,177	0,22	-10	32	55,31	0,18	28
1971	8	28	19	15	19,9009	20	14	54,419	0,29	-11	16	46,69	0,82	28
1971	8	28	19	15	23,9008	20	13	1,243	0,47	-12	0	0,30	0,77	28
1971	8	29	8	44	59,8423	13	30	30,894	0,26	-35	29	26,66	0,70	29
1971	8	29	8	45	7,8419	13	23	38,452	0,26	-36	21	33,89	0,56	29
1971	8	29	19	30	45,7046	22	41	15,970	0,73	47	21	40,48	1,41	28
1971	8	29	19	30	49,7046	22	36	3,682	1,15	46	39	47,07	1,83	28
1971	8	29	19	30	53,7047	22	30	54,937	0,68	45	56	9,15	0,82	28
1971	8	29	19	30	57,7046	22	25	50,813	0,81	45	11	2,10	1,42	28
1971	10	19	18	19	29,4836	20	12	35,633	0,23	-13	52	45,08	0,54	29
1971	10	19	18	19	37,4833	20	8	28,601	0,44	-15	4	57,41	0.66	29
1971	10	19	18	19	45,4827	20	4	17,253	0,94	-16	16	43,63	0,94	29
1971	10	26	8	54	3,9438	0	42	9,426	0,54	-48	6	41,10	0,55	29
1971	10	26	8	54	11,9440	0	40	58,095	0,61	-50	6	3,92	2,66	29
1971	10	26	8	54	19,9440	0	39	42,326	0,63	-52	5	29,60	0,93	29
1971	12	8	11	38	23,2321	1	9	26,109	0,45	-13	27	2,04	0,60	29
1971	12	20	9	59	38,0785	7	18	38,944	0,62	-52	31	5,49	1,18	29
1971	12	20	9	59	46,0781	7	21	48,567	0,77	-54	16	35,73	0.84	29
1971	12	20	9	59	54,0788	7	25	17,506	0,84	-56	1	37,96	1,28	29

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DATE						R.A.1950.0			RMS	DECL.1950.0			RMS	STATION
YEAR	MO	DA	HR	MIN	SEC	HR	MIN	SEC		DEG	MIN	SEC		
1971	12	20	10	0	2.0791	7	29	9.061	0.46	-57	46	2.25	1.21	29
1971	12	20	10	0	10.0786	7	33	25.929	0.69	-59	29	27.09	0.91	29

SATELLITE 1968 026 A OV1-13 SDC NUMBER 3173

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	5	25	11	32	15,9750	15	47	33,102	0,54	-52	35	42,02	0,65	40
1971	5	25	11	32	16,0013	13	24	51,102	0,50	-45	16	31,47	0,79	29
1971	5	25	11	32	31,9748	15	47	54,753	0,24	-53	10	42,69	1.08	40
1971	5	25	11	32	32,0017	13	23	9,216	0,39	-45	48	20,81	0,56	29
1971	5	25	11	32	47,9745	15	48	17,788	0,28	-53	45	48,05	0,61	40
1971	5	25	11	32	48,0014	13	21	24,283	0,22	-46	20	29,96	0,68	29
1971	5	25	11	33	3,9744	15	48	42,180	0,39	-54	21	13,59	0,73	40
1971	5	25	11	33	4,0014	13	19	36,731	0,30	-46	52	36,54	0,39	29
1971	5	25	11	33	19,9742	15	49	8,410	0,51	-54	56	55,73	0,70	40
1971	5	25	11	33	20,0015	13	17	45,706	0,31	-47	24	45,80	0,57	29
1971	5	25	11	33	35,9738	15	49	35,971	0,32	-55	32	41,06	0,42	40
1971	5	25	11	33	36,0017	13	15	51,517	0,27	-47	57	3,55	0,76	29
1971	5	25	11	33	51,9731	15	50	2,485	0,59	-56	8	34,01	0,66	40
1971	5	25	11	33	52,0015	13	13	53,994	0,48	-48	29	20,04	0,68	29
1971	5	25	11	34	7,9726	15	50	33,543	0,35	-56	44	53,64	0,54	40
1971	5	25	11	34	8,0009	13	11	58,622	0,24	-49	2	21,16	0,87	29
1971	5	25	11	34	23,9716	15	51	5,168	0,34	-57	21	12.37	0.38	40
1971	5	25	11	34	24,0014	13	9	49,204	1,03	-49	34	8.76	0,68	29
1971	5	25	11	34	40,0015	13	7	39,980	0,65	-50	6	43,98	0,53	29
1971	5	25	11	34	55,9700	15	52	14,140	0,33	-58	34	40.71	1,12	40

SATELLITE 1969 026 B   OV1-14   SDC NUMBER 3174

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	2	25	14	54	15.9964	12	54	8.049	0.39	-39	17	8.63	0.52	40
1971	2	25	14	54	23.9964	12	53	33.999	0.45	-40	7	11.45	0.37	40
1971	2	25	14	54	31.9965	12	52	59.285	0.50	-40	56	24.94	1.31	40
1971	2	25	14	54	31.9992	9	29	16.040	0.54	-19	6	58.88	0.94	29
1971	2	25	14	54	39.9957	12	52	24.688	0.30	-41	45	10.92	0.85	40
1971	2	25	14	54	39.9994	9	28	13.133	0.40	-19	49	54.74	0.63	29
1971	2	25	14	54	47.9862	12	51	50.960	0.40	-42	33	15.07	1.08	40
1971	2	25	14	54	47.9995	9	27	9.768	0.55	-20	32	26.16	1.18	29
1971	2	25	14	54	55.9863	12	51	16.272	0.50	-43	20	45.22	1.17	40
1971	2	25	14	54	55.9996	9	26	5.635	0.44	-21	14	54.91	0.52	29
1971	2	25	14	55	3.9956	12	50	41.233	0.25	-44	8	1.67	0.76	40
1971	2	25	14	55	11.9955	12	50	7.330	0.25	-44	54	20.05	0.56	40
1971	2	25	14	55	12.0002	9	23	56.037	0.33	-22	38	10.06	0.56	29
1971	2	25	14	55	19.9846	12	49	33.173	0.32	-45	40	17.00	1.16	40
1971	2	25	14	55	20.0005	9	22	50.625	0.54	-23	19	41.78	0.82	29
1971	2	25	14	55	27.9951	12	48	57.318	0.47	-46	26	8.07	1.23	40
1971	2	25	14	55	35.9943	12	48	23.490	0.36	-47	10	36.22	0.82	40
1971	2	25	14	55	36.0011	9	20	38.301	0.47	-24	40	14.19	1.12	29
1971	2	25	14	55	51.9942	12	47	48.604	0.56	-47	54	55.44	1.05	40
1971	3	23	14	40	31.9814	10	54	19.621	0.34	-60	48	38.02	1.74	40
1971	3	23	14	40	32.0060	9	25	32.129	0.35	-37	4	59.20	0.41	29
1971	3	23	14	40	48.0060	9	24	1.088	0.25	-37	40	44.90	0.65	29
1971	3	23	14	41	3.9813	10	49	17.658	0.30	-61	59	34.07	0.22	40
1971	3	23	14	41	4.0058	9	22	28.682	0.35	-38	16	0.34	0.63	29
1971	3	23	14	41	19.9813	10	46	40.607	0.25	-62	34	7.42	0.71	40
1971	3	23	14	41	20.0055	9	20	55.589	0.26	-38	50	41.40	0.81	29
1971	3	23	14	41	35.9809	10	44	2.620	0.34	-63	7	36.21	0.69	40
1971	3	23	14	41	36.0049	9	19	21.161	0.34	-39	24	45.94	0.75	29
1971	3	23	14	41	51.9808	10	41	17.679	0.45	-63	40	45.97	0.86	40
1971	3	23	14	42	7.9804	10	38	33.288	0.48	-64	12	41.76	0.47	40
1971	3	23	14	42	8.0044	9	16	9.191	0.23	-40	31	20.40	0.65	29
1971	3	23	14	42	24.0040	9	14	31.691	0.50	-41	4	7.32	0.44	29
1971	3	23	14	42	39.9802	10	32	49.011	0.30	-65	15	4.44	1.08	40
1971	3	23	14	42	55.9800	10	29	46.656	0.33	-65	45	38.70	0.93	40
1971	3	23	14	42	56.0025	9	11	13.236	0.54	-42	7	36.91	0.55	29
1971	3	23	14	43	11.9793	10	26	48.728	0.15	-66	14	39.11	0.94	40
1971	3	23	14	43	43.9785	10	20	19.823	0.23	-67	12	46.63	1.02	40
1971	4	5	11	3	12.0070	12	18	45.381	0.37	-43	50	35.90	0.48	29
1971	4	5	11	3	27.9878	14	10	4.160	0.36	-42	20	59.97	1.15	40
1971	4	5	11	3	28.0073	12	17	44.183	0.30	-44	33	6.28	0.52	29
1971	4	5	11	3	43.9877	14	10	4.600	0.39	-42	50	3.87	0.55	40
1971	4	5	11	3	44.0072	12	16	43.251	0.41	-45	14	44.61	0.81	29
1971	4	5	11	3	59.9873	14	10	5.064	0.18	-43	30	58.50	1.97	40

SATELLITE 1968 026 B OV1-14 SDC NUMBER 3174

DATE YEAR	MO	DA	HR	MIN	SEC	R,A,1950,0 HR MIN SEC	RMS	DECL,1950,0 DEG MIN SEC	RMS	STATION
1971	4	5	11	4	0,0071	12 15 40,472	0,56	-45 56 17,77	1,27	29
1971	4	5	11	4	16,0070	12 14 37,550	0,46	-46 37 11,82	0,51	29
1971	4	5	11	4	31,8394	12 13 33,721	0,40	-47 17 56,92	0,44	29
1971	4	5	11	4	46,0070	12 12 28,468	0,29	-47 58 9,02	0,92	29
1971	4	5	11	4	47,9852	14 10 13,592	0,50	-45 14 10,99	0,79	40
1971	4	5	11	5	3,9839	14 10 16,709	0,27	-45 48 21,20	1,70	40
1971	4	5	11	5	4,0070	12 11 23,484	0,12	-48 37 43,69	0,57	29
1971	4	5	11	5	20,0067	12 10 17,221	0,30	-49 17 2,88	0,82	29
1971	4	5	11	6	23,9876	14 10 44,748	0,42	-48 35 10,50	1,39	40
1971	4	5	11	6	39,9784	14 10 51,228	0,36	-49 8 2,50	0,93	40

SATELLITE 1968 055 A RAE-A SDC NUMBER 3307

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	2	3	15	30	4.9970	11	51	31.180	0.30	-16	41	26.67	0.78	40
1971	2	3	15	30	20.9964	11	49	49.137	0.34	-17	23	54.11	0.48	40
1971	2	3	15	30	36.9964	11	48	6.872	0.24	-18	6	32.84	0.37	40
1971	2	3	15	30	52.9962	11	46	21.326	0.34	-18	49	30.23	0.30	40
1971	2	3	15	31	8.9957	11	44	35.554	0.40	-19	32	35.92	0.20	40
1971	2	3	15	31	24.9952	11	42	48.294	0.19	-20	15	58.02	0.47	40
1971	2	3	15	31	40.9947	11	40	59.505	0.17	-20	59	33.17	0.61	40
1971	2	3	15	31	56.9941	11	39	9.427	0.42	-21	43	20.12	0.61	40
1971	2	3	15	32	12.9933	11	37	17.625	0.38	-22	27	19.70	0.56	40
1971	2	3	15	32	28.9925	11	35	24.301	0.33	-23	11	28.63	0.75	40
1971	2	17	15	52	15.9768	12	20	16.479	0.30	-1	51	56.73	0.75	40
1971	2	17	15	52	16.0135	10	47	52.417	0.16	6	43	15.50	0.34	29
1971	2	17	15	52	32.0133	10	46	8.758	0.30	6	10	39.15	0.58	29
1971	2	17	15	52	47.9757	12	16	44.154	0.50	-3	11	37.99	0.62	40
1971	2	17	15	52	48.0132	10	44	24.594	0.19	5	38	1.24	0.33	29
1971	2	17	15	53	4.0130	10	42	39.904	0.36	5	5	20.05	0.51	29
1971	2	17	15	53	20.0126	10	40	54.865	0.29	4	32	37.36	0.84	29
1971	2	17	15	53	36.0119	10	39	9.268	0.17	3	59	54.24	0.67	29
1971	2	17	15	54	23.9714	12	5	45.169	0.53	-7	16	56.17	1.22	40
1971	2	17	15	54	39.9711	12	3	51.994	0.58	-7	58	39.68	0.72	40
1971	2	18	14	25	51.9961	12	38	5.283	0.52	-19	5	9.24	0.94	40
1971	2	18	14	26	7.9962	12	36	39.440	0.64	-19	45	51.38	1.25	40
1971	2	18	14	26	23.9958	12	35	12.525	0.36	-20	26	59.67	1.11	40
1971	2	18	14	26	24.0015	10	45	8.751	0.51	-11	26	18.38	0.56	29
1971	2	18	14	26	39.9762	12	33	44.693	0.48	-21	8	17.85	1.16	40
1971	2	18	14	26	40.0021	10	42	54.125	0.45	-12	3	51.24	0.71	29
1971	2	18	14	26	55.9760	12	32	15.737	0.45	-21	49	50.69	0.96	40
1971	2	18	14	26	56.0027	10	40	38.167	0.57	-12	41	23.51	0.73	29
1971	2	18	14	27	11.9754	12	30	45.586	0.42	-22	31	35.14	1.31	40
1971	2	18	14	27	12.0031	10	38	20.795	0.86	-13	18	53.36	1.35	29
1971	2	18	14	27	27.9940	12	29	14.127	0.26	-23	13	49.22	0.85	40
1971	2	18	14	27	28.0039	10	36	2.223	0.23	-13	56	23.20	0.59	29
1971	2	18	14	27	43.9931	12	27	41.591	0.56	-23	56	2.03	1.03	40
1971	2	18	14	27	44.0044	10	33	42.161	0.68	-14	33	48.96	0.54	29
1971	2	18	14	27	59.9926	12	26	7.350	0.33	-24	38	39.65	1.01	40
1971	2	18	14	28	0.0052	10	31	20.575	0.29	-15	11	12.28	0.57	29
1971	2	18	14	28	15.9915	12	24	32.873	0.49	-25	21	28.77	0.93	40
1971	2	18	14	28	16.0056	10	28	57.708	0.36	-15	48	31.02	0.49	29
1971	2	18	14	28	31.9906	12	22	55.352	0.43	-26	4	30.19	0.77	40
1971	2	18	14	28	32.0067	10	26	33.270	0.22	-16	25	44.66	0.43	29
1971	2	18	14	28	47.9709	12	21	17.095	0.73	-26	47	44.20	0.84	40
1971	2	18	14	29	3.9700	12	19	37.495	0.47	-27	31	15.45	0.70	40
1971	3	1	15	51	43.9925	11	38	34.172	0.51	-20	34	15.00	1.70	40

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1971	3	1	15	51	59,9923	11	36	8,174	0,60	-21	17	56,07	1,00	40
1971	3	1	15	52	0,0078	10	16	39,391	0,20	-7	49	32,42	0,68	29
1971	3	1	15	52	15,9925	11	33	41,216	0,24	-22	1	20,21	0,67	40
1971	3	1	15	52	16,0077	10	14	42,730	0,51	-8	20	3,65	0,98	29
1971	3	1	15	52	31,9923	11	31	11,403	0,54	-22	44	49,30	0,50	40
1971	3	1	15	52	32,0077	10	12	45,390	0,44	-8	50	26,88	0,64	29
1971	3	1	15	52	47,9922	11	28	40,389	0,62	-23	28	3,47	1,22	40
1971	3	1	15	52	48,0073	10	10	47,464	0,86	-9	20	41,98	0,68	29
1971	3	1	15	53	3,9919	11	26	7,431	0,35	-24	11	14,07	0,62	40
1971	3	1	15	53	4,0068	10	8	48,520	0,43	-9	50	50,57	1,12	29
1971	3	1	15	53	19,9921	11	23	32,400	0,53	-24	54	18,21	0,69	40
1971	3	1	15	53	20,0068	10	6	49,287	0,37	-10	20	44,94	0,45	29
1971	3	1	15	53	36,0063	10	4	49,132	0,57	-10	50	32,23	0,89	29
1971	3	1	15	53	51,9917	11	18	16,652	0,25	-26	19	54,33	0,92	40
1971	3	1	15	53	52,0058	10	2	48,444	0,70	-11	20	9,99	0,85	29
1971	3	1	15	54	7,9913	11	15	35,390	0,46	-27	2	29,03	1,13	40
1971	3	1	15	54	8,0048	10	0	46,804	0,40	-11	49	37,95	0,39	29
1971	3	1	15	54	23,9912	11	12	52,302	0,80	-27	44	47,72	0,82	40
1971	3	1	15	54	24,0044	9	58	44,610	0,30	-12	18	53,84	0,84	29
1971	3	17	18	5	51,9867	4	5	22,161	0,52	-61	57	16,52	0,93	29
1971	3	17	18	6	7,9868	4	0	57,744	0,48	-61	24	51,13	0,73	29
1971	3	17	18	6	23,9867	3	56	43,480	0,32	-60	52	9,07	0,53	29
1971	3	17	18	6	39,9867	3	52	38,637	0,18	-60	19	20,90	0,55	29
1971	3	17	18	6	55,9873	3	48	43,969	0,73	-59	46	21,63	0,80	29
1971	3	17	18	7	11,9874	3	44	58,090	0,27	-59	13	8,09	0,46	29
1971	3	17	18	7	27,9881	3	41	20,467	0,33	-58	39	54,46	0,86	29
1971	3	17	18	7	43,9894	3	37	51,177	0,30	-58	9	23,77	0,60	29
1971	3	17	18	28	31,9856	9	7	7,436	0,51	-42	21	51,95	2,48	29
1971	3	17	18	28	31,9983	11	39	54,135	0,59	-59	38	34,78	0,23	40
1971	3	17	18	28	47,9853	9	3	8,108	0,61	-42	41	20,11	1,03	29
1971	3	17	18	28	47,9982	11	35	28,588	0,40	-60	18	46,18	0,17	40
1971	3	17	18	29	3,9852	8	59	7,503	0,35	-43	0	5,20	0,51	29
1971	3	17	18	29	3,9980	11	30	52,307	0,26	-60	58	22,64	0,75	40
1971	3	17	18	29	19,9852	8	55	5,671	0,92	-43	18	7,67	0,21	29
1971	3	17	18	29	19,9975	11	26	6,023	0,51	-61	37	21,01	0,44	40
1971	3	17	18	29	35,9850	8	51	2,681	1,12	-43	35	31,23	0,79	29
1971	3	17	18	29	35,9971	11	21	8,620	0,36	-62	15	42,92	0,50	40
1971	3	17	18	29	51,9844	8	46	58,988	0,43	-43	52	3,89	0,37	29
1971	3	17	18	30	7,9844	8	42	54,258	0,51	-44	7	56,80	0,59	29
1971	3	17	18	30	7,9958	11	10	39,700	0,40	-63	30	11,48	0,92	40
1971	3	17	18	30	23,9840	8	38	48,588	0,52	-44	23	11,96	0,42	29
1971	3	17	18	30	23,9946	11	5	6,604	0,34	-64	6	14,38	0,66	40
1971	3	17	18	30	39,9844	8	34	42,166	0,56	-44	37	36,66	0,59	29

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1971	3	17	13	30	39,9940	10	59	20,185	0,11	-64	41	24,84	0.52	40
1971	3	17	13	30	55,9841	8	30	35,821	0,22	-44	51	22,38	0.71	29
1971	3	17	13	30	55,9931	10	53	21,269	0,39	-65	15	44,11	0.60	40
1971	3	17	13	31	11,9946	10	47	7,916	1,47	-65	49	2,63	1,83	40
1971	3	23	11	34	39,9846	10	27	15,689	0,84	-52	15	45,12	0,29	29
1971	3	23	11	34	39,9951	13	16	48,073	0,24	-52	22	16,66	0.29	40
1971	3	23	11	34	55,9842	10	22	14,363	0,53	-52	46	42,92	0.47	29
1971	3	23	11	35	11,9840	10	17	7,009	0,22	-53	16	49,50	0,55	29
1971	3	23	11	35	11,9946	13	13	34,931	0,28	-53	47	37,70	0.57	40
1971	3	23	11	35	27,9832	10	11	51,985	0,55	-53	46	3,66	0.49	29
1971	3	23	11	35	27,9945	13	11	53,851	0,31	-54	30	31,87	0.44	40
1971	3	23	11	35	43,9838	10	6	32,060	0,31	-54	14	17,34	0.44	29
1971	3	23	11	35	43,9940	13	10	10,897	0,46	-55	13	30,50	0.76	40
1971	3	23	11	35	59,9832	10	1	5,647	0,54	-54	41	36,19	0.46	29
1971	3	23	11	35	59,9935	13	8	22,576	0,23	-55	56	34,80	0.87	40
1971	3	23	11	36	15,9833	9	55	33,259	0,57	-55	7	45,95	0.48	29
1971	3	23	11	36	15,9929	13	6	31,656	0.37	-56	39	49,08	0.99	40
1971	3	23	11	36	31,9834	9	49	54,556	0.39	-55	33	5,81	0.78	29
1971	3	23	11	36	47,9831	9	44	9,895	0,42	-55	57	14,60	0.21	29
1971	3	23	11	37	3,9838	9	38	19,691	0,43	-56	20	18,91	0.58	29
1971	4	7	14	5	4,0026	10	35	34,944	0,48	-25	51	30,05	0.45	29
1971	4	7	14	5	20,0026	10	32	54,277	0,47	-26	17	17,93	0.36	29
1971	4	7	14	5	36,0025	10	30	12,544	0,69	-26	42	55,55	0.63	29
1971	4	7	14	5	52,0025	10	27	29,651	0,51	-27	8	3,64	0.95	29
1971	4	7	14	6	8,0022	10	24	45,967	0,71	-27	32	52,64	1,08	29
1971	4	7	14	6	24,0017	10	22	1,456	0,76	-27	57	10,97	0.48	29
1971	4	7	14	6	40,0010	10	19	16,188	0,52	-28	21	13,80	0.78	29
1971	4	7	14	6	56,0010	10	16	29,493	0,39	-28	44	43,56	0,65	29
1971	4	7	14	7	28,0000	10	10	54,104	0,53	-29	30	40,66	2.07	29
1971	4	8	12	31	12,0036	13	48	48,823	0,62	-40	7	41,66	2.41	40
1971	4	8	12	31	12,0173	11	31	46,778	0,26	-31	7	57,82	0.89	29
1971	4	8	12	31	28,0032	13	46	55,346	0,59	-40	52	34,27	0,87	40
1971	4	8	12	31	28,0177	11	28	37,237	0,54	-31	42	53,15	0.84	29
1971	4	8	12	31	44,0027	13	44	59,137	0,40	-41	37	26,79	1.15	40
1971	4	8	12	31	44,0037	11	25	25,484	0,77	-32	17	31,44	1.11	29
1971	4	8	12	32	0,0022	13	43	0,502	0,56	-42	22	17,64	1.97	40
1971	4	8	12	32	0,0183	11	22	10,427	0,76	-32	51	42,80	1.07	29
1971	4	8	12	32	16,0015	13	40	58,783	1,35	-43	7	11,62	1.96	40
1971	4	8	12	32	16,0346	11	18	53,960	0,57	-33	25	27,03	0.70	29
1971	4	8	12	32	32,0006	13	38	54,030	0,34	-43	52	22,85	0.85	40
1971	4	8	12	32	32,0191	11	15	34,470	0,92	-33	58	50,30	0.87	29
1971	4	8	12	32	47,9999	13	36	45,907	0,60	-44	37	31,40	0.97	40
1971	4	8	12	32	48,0193	11	12	12,503	0,51	-34	31	40,85	0.37	29

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1971	4	8	12	33	4,0199	11	8	48,320	0,70	-35	4	9,14	1,07	29
1971	4	8	12	33	16,0201	11	5	21,234	0,51	-35	36	3,90	0,76	29
1971	4	8	12	33	19,9976	13	32	20,572	0,90	-46	7	46,99	1,51	40
1971	4	8	12	33	19,9992	13	34	35,091	0,61	-45	22	38,63	0,87	40
1971	4	8	12	33	35,9960	13	30	2,707	0,99	-46	52	59,87	0,97	40
1971	4	8	12	33	36,0201	11	1	51,994	0,65	-36	7	33,94	0,59	29
1971	4	8	14	5	3,9964	12	8	25,650	1,11	-44	58	2,26	1,98	40
1971	4	8	14	5	19,9963	12	4	46,424	0,52	-45	37	24,92	0,93	40
1971	4	8	14	5	35,9958	12	1	3,302	0,58	-46	16	9,75	1,13	40
1971	4	8	14	5	51,9957	11	57	15,860	0,71	-46	54	14,71	1,13	40
1971	4	8	14	6	7,9951	11	53	23,528	0,50	-47	31	55,37	0,69	40
1971	4	8	14	6	23,9944	11	49	27,367	1,38	-48	8	57,38	1,18	40
1971	4	8	14	6	39,9940	11	45	25,437	0,69	-48	45	19,94	1,38	40
1971	4	8	14	6	55,9932	11	41	19,170	0,87	-49	21	5,96	1,13	40
1971	4	8	14	7	11,9926	11	37	7,889	0,79	-49	56	13,46	1,10	40
1971	4	8	14	7	43,9907	11	28	30,699	0,36	-51	4	11,19	0,77	40
1971	4	8	14	7	59,9900	11	24	4,364	0,52	-51	37	9,10	0,35	40
1971	4	8	14	8	15,9893	11	19	32,976	0,71	-52	9	17,32	0,79	40
1971	4	25	12	14	56,0139	9	2	11,701	0,15	-47	34	20,98	0,39	29
1971	4	25	12	15	11,9883	10	46	19,399	0,58	-71	21	36,92	0,57	40
1971	4	25	12	15	12,0136	8	58	0,414	0,37	-47	38	50,36	0,62	29
1971	4	25	12	15	27,9878	10	36	50,190	0,53	-71	39	3,87	0,40	40
1971	4	25	12	15	28,0140	8	53	50,100	0,42	-47	42	42,70	0,33	29
1971	4	25	12	15	43,9874	10	27	6,340	0,33	-71	54	41,15	0,43	40
1971	4	25	12	15	44,0138	8	49	41,103	0,38	-47	45	51,48	0,33	29
1971	4	25	12	15	59,9868	10	17	10,015	1,14	-72	8	26,69	0,73	40
1971	4	25	12	16	0,0139	8	45	33,160	0,36	-47	48	27,19	0,70	29
1971	4	25	12	16	15,9860	10	7	3,467	1,08	-72	20	19,91	0,55	40
1971	4	25	12	16	31,9853	9	56	49,270	0,82	-72	30	15,23	0,75	40
1971	4	25	12	16	32,0143	8	37	21,938	0,28	-47	51	39,49	0,61	29
1971	4	25	12	16	47,9844	9	46	27,759	0,67	-72	38	11,90	0,77	40
1971	4	25	12	16	48,0140	8	41	27,025	0,42	-47	50	24,01	0,84	29
1971	4	25	12	16	48,0140	8	33	19,007	0,35	-47	52	22,75	0,33	29
1971	4	25	12	17	3,9833	9	36	2,297	0,34	-72	44	16,86	0,72	40
1971	4	25	12	17	4,0140	8	29	17,114	0,38	-47	52	28,57	0,53	29
1971	4	25	12	17	19,9823	9	25	33,953	0,66	-72	48	17,78	1,20	40
1971	4	25	12	17	20,0136	8	25	17,293	0,45	-47	52	45,05	0,43	29
1971	4	29	13	18	7,9871	12	14	10,938	0,50	-53	9	36,88	0,47	40
1971	4	29	13	18	8,0157	10	47	55,560	0,48	-31	46	26,81	0,46	29
1971	4	29	13	18	23,9869	12	9	31,969	0,22	-53	42	13,21	0,31	40
1971	4	29	13	18	24,0167	10	44	57,761	0,19	-32	7	27,99	0,97	29
1971	4	29	13	18	39,9863	12	4	47,074	0,25	-54	14	5,10	0,43	40
1971	4	29	13	18	40,0140	10	41	58,843	0,57	-32	28	8,55	0,54	29

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1971	4	29	13	18	55.9862	11	59	56.699	0.43	-54	45	5.71	0.91	40
1971	4	29	13	18	56.0167	10	38	59.566	0.31	-32	48	19.03	0.41	29
1971	4	29	13	19	11.9853	11	55	0.493	0.57	-55	15	12.40	0.63	40
1971	4	29	13	19	12.0168	10	35	59.423	0.59	-33	8	0.64	0.86	29
1971	4	29	13	19	27.9853	11	49	58.276	0.59	-55	44	28.56	0.67	40
1971	4	29	13	19	28.0172	10	32	58.563	0.57	-33	27	15.88	0.61	29
1971	4	29	13	19	43.9842	11	44	50.753	0.40	-56	12	47.96	0.43	40
1971	4	29	13	19	44.0173	10	29	57.081	0.28	-33	45	58.75	0.70	29
1971	4	29	13	19	59.9837	11	39	37.122	1.03	-56	40	13.03	0.82	40
1971	4	29	13	20	0.0176	10	26	54.841	0.41	-34	4	16.22	0.36	29
1971	4	29	13	20	15.9825	11	34	18.289	0.26	-57	6	40.69	0.44	40
1971	4	29	13	20	16.0181	10	23	52.112	0.23	-34	22	8.52	0.42	29
1971	4	29	13	20	31.9822	11	28	53.473	0.21	-57	32	9.18	0.40	40
1971	4	29	13	20	32.0178	10	20	48.870	0.38	-34	39	30.43	0.44	29
1971	4	29	13	20	47.9810	11	23	23.228	0.29	-57	56	36.44	0.32	40
1971	4	29	13	21	3.9800	11	17	48.291	0.12	-58	20	4.33	0.40	40
1971	6	30	9	23	59.9868	17	26	57.321	0.32	-22	50	0.99	0.26	40
1971	6	30	9	24	15.9986	17	25	52.869	0.40	-23	27	28.52	0.57	40
1971	6	30	9	24	16.0026	15	44	54.418	0.23	-18	5	48.26	1.00	29
1971	6	30	9	24	31.9987	17	24	47.981	0.30	-24	5	5.99	0.60	40
1971	6	30	9	24	32.0027	15	42	37.907	0.38	-18	45	55.28	0.74	29
1971	6	30	9	24	47.9984	17	23	42.215	0.32	-24	42	56.47	0.43	40
1971	6	30	9	24	48.0034	15	40	19.608	0.49	-19	26	2.26	0.61	29
1971	6	30	9	25	3.9981	17	22	35.785	0.59	-25	21	11.88	0.66	40
1971	6	30	9	25	4.0034	15	37	59.414	0.26	-20	6	14.23	0.52	29
1971	6	30	9	25	19.9977	17	21	28.392	0.14	-25	59	35.12	0.61	40
1971	6	30	9	25	20.0040	15	35	36.853	0.44	-20	46	26.61	0.51	29
1971	6	30	9	25	35.9975	17	20	20.362	0.42	-26	38	17.99	0.31	40
1971	6	30	9	25	36.0041	15	33	12.772	0.43	-21	26	41.45	0.82	29
1971	6	30	9	25	51.9971	17	19	11.435	0.71	-27	17	12.67	0.40	40
1971	6	30	9	25	52.0045	15	30	46.516	0.65	-22	7	0.24	0.76	29
1971	6	30	9	26	7.9971	17	18	1.557	0.41	-27	56	24.49	0.88	40
1971	6	30	9	26	8.0047	15	28	18.088	0.47	-22	47	12.54	0.20	29
1971	6	30	9	26	23.9964	17	16	51.035	0.22	-28	35	54.96	0.53	40
1971	6	30	9	26	24.0051	15	25	47.415	0.35	-23	27	27.16	0.38	29
1971	6	30	9	26	39.9955	17	15	39.395	0.59	-29	15	32.24	0.68	40
1971	6	30	9	26	40.0053	15	23	14.738	0.36	-24	7	35.93	0.40	29
1971	7	18	10	48	47.9969	18	18	56.759	0.40	8	56	59.39	0.51	40
1971	7	18	10	48	48.0073	16	46	1.523	0.47	16	42	17.72	0.68	29
1971	7	18	10	49	4.0069	16	44	23.126	0.58	16	11	8.63	1.34	29
1971	7	18	10	49	20.0072	16	42	44.389	0.34	15	39	51.16	0.34	29
1971	7	18	10	49	36.0071	16	41	5.174	0.27	15	8	29.03	0.36	29
1971	7	18	10	49	52.0068	16	39	25.820	0.49	14	36	52.89	0.55	29

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DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1950.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	7	18	18	50	8,0065	16	37	46,138	0,34	14	5	11,73	0,21	29
1971	7	18	18	50	24,0060	16	36	6,076	0,44	13	33	22,39	0,46	29
1971	7	18	18	50	40,0057	16	34	25,429	0,26	13	1	27,08	0,73	29
1971	7	18	18	50	56,0052	16	32	44,648	0,75	12	29	20,06	1,25	29
1971	9	7	9	37	19,9980	17	17	38,813	0,40	-43	25	31,07	1,17	40
1971	9	7	9	37	19,9996	15	56	26,468	0,20	-24	5	12,03	0,98	29
1971	9	7	9	37	35,9899	17	14	0,397	0,45	-44	3	17,39	0,70	40
1971	9	7	9	37	35,9996	15	53	54,431	0,21	-24	30	44,87	0,77	29
1971	9	7	9	37	51,9895	17	10	17,955	0,42	-44	40	29,53	0,53	40
1971	9	7	9	37	51,9991	15	51	21,042	0,44	-24	55	52,04	0,68	29
1971	9	7	9	38	7,9890	17	6	32,034	0,52	-45	17	5,78	0,71	40
1971	9	7	9	38	7,9989	15	48	46,953	0,34	-25	20	42,77	0,81	29
1971	9	7	9	38	23,9888	17	2	41,452	0,37	-45	53	4,75	0,90	40
1971	9	7	9	38	23,9987	15	46	12,309	0,69	-25	45	13,14	2,06	29
1971	9	7	9	38	39,9886	16	58	47,100	0,33	-46	28	29,87	0,65	40
1971	9	7	9	38	39,9983	15	43	36,532	0,46	-26	9	17,98	1,17	29
1971	9	7	9	38	55,9882	16	54	49,068	0,53	-47	3	15,30	0,83	40
1971	9	7	9	38	55,9979	15	41	0,240	0,51	-26	32	59,53	0,55	29
1971	9	7	9	39	11,9878	16	50	46,284	0,24	-47	37	21,76	0,69	40
1971	9	7	9	39	11,9974	15	38	22,842	0,49	-26	56	25,47	0,84	29
1971	9	7	9	39	27,9873	16	46	39,807	0,86	-48	10	47,87	0,27	40
1971	9	7	9	39	27,9969	15	35	44,359	0,57	-27	19	18,33	0,98	29
1971	9	7	9	39	43,9864	16	42	29,135	0,65	-48	43	28,35	0,47	40
1971	9	7	9	39	43,9963	15	33	5,618	0,36	-27	41	56,02	0,67	29
1971	7	18	18	51	27,9946	18	4	6,991	0,38	3	15	14,03	0,34	40

SATELLITE 1969 018 C APOLLO 9 LM SDC NUMBER 3771

DATE YEAR	MO	DA	HR	MIN	SEC	R.A.1958.0 HR	MIN	SEC	RMS	DECL.1950.0 DEG	MIN	SEC	RMS	STATION
1971	2	28	17	8	32,0083	12	43	39,372	1,14	-10	52	37,65	0.74	29
1971	2	28	17	8	48,0033	12	46	27,340	0,38	-10	52	53,16	0.65	29
1971	2	28	17	9	3,9863	14	44	0,602	0,34	-23	28	14,86	1.45	40
1971	2	28	17	9	4,0086	12	49	14,808	1,99	-10	52	56,90	0.23	29
1971	2	28	17	9	20,0087	12	52	1,937	0,53	-10	52	51,47	1.08	29
1971	2	28	17	9	35,9857	14	49	38,776	0,29	-23	12	5,58	0.54	40
1971	2	28	17	9	36,0093	12	54	48,901	0,59	-10	52	28,28	0.70	29
1971	2	28	17	9	51,9854	14	52	24,968	0,92	-23	3	50,86	0.78	40
1971	2	28	17	9	52,0097	12	57	34,576	0,41	-10	51	54,67	0.57	29
1971	2	28	17	10	7,9847	14	55	9,955	0,70	-22	55	24,48	0.53	40
1971	2	28	17	10	8,0102	13	0	20,385	0,50	-10	51	10,99	0.17	29
1971	2	28	17	10	23,9837	14	57	52,939	0,59	-22	46	50,81	0.71	40
1971	2	28	17	10	24,0106	13	3	5,644	0,92	-10	50	14,97	0.43	29
1971	2	28	17	10	39,9835	15	0	34,413	1,00	-22	38	14,08	0.83	40
1971	2	28	17	10	55,9828	15	3	14,240	0,76	-22	29	24,96	0.57	40
1971	2	28	17	10	56,0119	13	8	35,372	0,47	-10	47	41,92	0.20	29
1971	2	28	17	11	11,9825	15	5	52,422	0,90	-22	20	30,14	0.58	40
1971	2	28	17	11	27,9819	15	8	29,161	0,50	-22	11	29,59	0.30	40

SATELLITE 1970 093 A OPS 5960 SDC NUMBER 4630

DATE						R.A.1950,0			RMS	DECL.1950.0			RMS	STATION
YEAR	MO	DA	HR	MIN	SEC	HR	MIN	SEC		DEG	MIN	SEC		
1971	4	30	0	51	43,0560	15	26	30,004	0,51	-3	23	13,74	0.44	28
1971	4	30	0	51	49,0558	15	26	55,675	0,36	-3	22	24,83	0.40	28
1971	4	30	0	52	31,0557	15	27	47,408	0,48	-3	20	47,02	0.70	28
1971	4	30	19	47	30,9542	14	23	11,982	0,91	-6	40	6,97	1.43	28
1971	4	30	19	47	46,9540	14	23	38,396	0,56	-6	39	4,74	1.36	28
1971	4	30	19	48	2,9542	14	24	4,554	0,87	-6	38	5,71	0,81	28
1971	4	30	19	48	18,9541	14	24	30,309	0,74	-6	37	9,75	1.22	28
1971	4	30	20	35	1,5147	15	39	42,081	0,67	-3	58	29,96	1.23	28
1971	4	30	20	35	17,5148	15	40	7,457	0,32	-3	57	40,49	0.46	28
1971	9	14	9	58	50,2933	19	12	24,723	0,57	15	55	20,26	0.43	29
1971	9	14	10	1	26,9773	19	15	49,901	0,49	15	53	28,92	0.53	29
1971	9	14	10	2	45,9108	19	17	32,052	0,24	15	52	38,63	0.41	29
1971	9	14	13	2	59,1096	0	37	27,435	0,46	7	0	53,61	0.19	29

6. REFERENCES:

a. 18SSM 55-1; "Baker-Nunn Tactical Operating Instructions", 25 July 1971.

b. 9ADD Analysis Memorandum 68-15; "Catalog of Precisely Reduced Observations for 1967", 28 June 1968.

7. <u>DISTRIBUTION LIST</u>:

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AE-C 73-101A-08A
AE-E 75-107A-07A
AE-D 75-096A-08A

NEUTRAL ATMOSPHERE COMPOSITION (NACE)

A. The NACE experiment measures the concentrations of the neutral gas constituents in the thermosphere. This experiment provides the instantaneous and global distributions of neutral helium, atomic oxygen, nitrogen, argon, and total mass density.

B. The NACE is a direct extension of the OGO-6 Neutral Composition Experiment (FO-4) and employs a quadrupole mass spectrometer. A spherical ante-chamber is coupled to the atmosphere through a knife-edged orifice. The gas in the ante-chamber is continuously sampled by the hot filament ion source which accelerates a beam of ions into the quadrupole mass filter. The ions of selected m/e ratio strike the first dynode of the off-axis electron multiplier. Amplified pulses out of the multiplier are counted to provide a measure of the density of the selected mass in the spherical ante-chamber, which is related to the ambient atmospheric density using the standard F(s) equation. The detector system provides a dynamic range of 10^0, and an additional factor of 40 in range is achieved by automatically desensitizing the ion source at the high densities expected to be encountered near perigee.

C. The words 35 to 40 of the UA file have the following meaning:

35. N_2 density (num/cm^3)
36. O density (num/cm^3)
37. He density (num/cm^3)
38. Ar density (num/cm^3)
39. NO density (num/cm^3)
40. $O+2O_2$ density (num/cm^3)

add 47 words first 35+47= 82 - word # in Data Record

The 10 least significant bits of each word provide an estimate of the fractional error which is calculated by dividing the integer value of these bits by 512. This error reflects counting statistics and background subtraction errors but not the overall instrument calibration error.

E. Laboratory gas calibration was performed with helium, molecular oxygen and nitrogen, and argon using a calibration chamber pumped by Zeolite at liquid-helium temperature. Porous vycor leaks provide known conductances from pressure reference volumes. The reference standards used are Baratron capacitance manometers. Calibration accuracy for the nonreactive gases is approximately 10%.

F. Atomic oxygen above 250 km, particularly in the inleg of each perigee pair, may be too low by 30 to 50% because of surface interactions.

G. The NACE-C instrument failed on February 16, 1974 and data for that day (or thereafter) is suspect.

H. See F above.

I. Measured counts are corrected for dead time, zero level, filament emission, and warmup variation and converted to antechamber (or source) densities using the laboratory calibrations. The source density in the wake of each spin cycle is subtracted from the individual densities and the standard F(s) equation (thermal transpiration in a moving system) used to convert to ambient density. The background for despun orbits is based on nearby spinning orbits. For the UA file, the densities over a 30 second period centered on the required time are fit with a straight line as a function of time and the required density calculated.

K. "A Neutral-Atmosphere Composition Experiment for the Atmosphere Explorer-C, -D, and -E" by D. T. Pelz, C. A. Reber, A. E. Hedin, and G. C. Carignan, Radio Sci, 8, 277-283, 1973.

Duplicate in TRP

AE-C 73-101A-07(A)
AE-E 75-107A-07A

B28956

Guide To The Use of Unified Abstract
Data From The Open Source Neutral
Mass Spectrometer Experiment-Atmosphere
Explorers C, D and E.

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and A. O. Nier

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55455

Feb. 1, 1977

Introduction

The Open Source Neutral Mass Spectrometers (hereafter referred to as the OSS) perform measurements of the neutral upper atmosphere with a time resolution of 16 Hz, giving approximately 10^5 density determinations from a single 30 minute pass. For many aeronomic studies a lower resolution data set is sufficient and even preferred. The Unified Abstract (UA) Files provide such a data base. In the case of the OSS, measurements of an ambient density are averaged over a 15 second interval that is centered on times which are multiples of 15 seconds of the day (in Universal Time). Of course, altitude variations during the 15 second averaging interval must be considered, as well as the errors in the individual data points which make up the average. The resulting UA data points for the OSS are to be interpreted as the 15 second time-averaged density about the specified abstract time for the altitude crossed by the satellite at the abstract time.

This document follows the topical guidelines suggested in 'Guidelines For Submitting Data to the National Space Science Data Center' and is intended to introduce non-AE science and data processing personnel to the use of OSS UA file data. It could as well serve as a reference for those with direct access to the AE computer system.

A. Experiment Rationale and Motivation

The Atmosphere Explorer-C, -D and -E satellites have been described in detail by Dalgarno et al. (1973). The Open Source Neutral Mass Spectrometer was designed to measure the common neutral constituent densities from the lower thermosphere to the exosphere (Nier et al. 1973). The quasi-open source design was chosen to enhance the possibility of measuring reactive constituents such as atomic oxygen, and to complement the closed-source design of the other neutral spectrometers. Specific discussions of interesting aeronomic problems which require neutral density measurements can be found in the special issue of Radio Science referenced above. Papers published by the OSS group (see references, part K), as well as the AE publication list, should be consulted for further examples.

B. Instrument Description

The OSS flown on Atmosphere Explorer-C, -D and -E is a double-focusing magnetic-deflection instrument with an electron-bombardment ion source. Ambient particles enter the ion source region where they are ionized by a magnetically collimated 75 ev electron beam produced by a heated 0.015 cm diameter tungsten-rhenium hairpin filament. In the 'normal' mode of operation the ions are drawn out of the source region by an electric field, pass through a pair of focusing plates and are accelerated to a narrow ground slit. After passing a collimating slit, the ions enter a variable electric field analyzer and a constant magnetic field analyzer where energy focusing and mass separation take place. The magnetic field is produced by a 4000 gauss permanent magnet. At the exit of the magnetic analyzer are two slits which allow ions of high and low mass (in an 8:1 ratio) to be collected simultaneously by two detectors. The low mass spiral electron multiplier measures ions from 1 to 6 AMU while the high mass tandem electrometer-multiplier detector detects ions from 6 to 48 AMU. The high mass detector consists of a 50% transmission electrometer grid followed by a spiral electron multiplier, thus allowing measurement of the larger mass constituents over an extended range. Preprogrammed electronics enable measurements to be made in a peak stepping, toggle or scan mode. In the peak stepping and toggle modes, voltages are changed in steps allowing data to be taken on a series predetermined peaks without spending time measuring over the 'valleys' between peaks as is done in the scan mode. Other instrument commands allow switching to an electron beam energy of 25 ev and slowing down the 16 steps/sec sample rate by a factor of 8. Redundant filaments are employed in case one burns out while variable multiplier voltage supplies are used to offset any degradation in multiplier gain that may occur. The status of the instrument configuration and housekeeping voltages and temperatures are monitored through subcommutated telemetry words.

In the source region a reactive gas such as O recombines to form O_2 after striking the surrounding instrument surfaces. In the 'normal' mode the contribution to the 32 small peak from the recombined 16 is not easily resolved. To alleviate that problem a fly-through mode of operation was added to the OSS. In this mode there is no electric field used to draw ions out of the electron beam when they are formed. Ambient particles which have struck the ion source and have become thermally accommodated have an energy of less than 0.1 ev which is not enough to overcome the negative space charge potential holding ions in the electron beam. On the other hand, ambient particles which have not struck surfaces retain their full energy due to the relative velocity between the particle and the spacecraft. These 'energetic' particles readily escape from the beam and thus enable direct measurements of O and O_2 to be made. During spinning orbits, the shape of the fly-through signal as the instrument passes through the ram direction can be used to determine the ambient temperature. Measurements of winds can also be obtained by using the period between the signal maxima in fly-through.

The general sensitivity of the spectrometers in the normal mode is 10^{-5} amp torr^{-1}. For low altitude data taking, a small ion sputter pump is used to reduce ion-neutral collisions within the spectrometer. Neutral constituent densities over the range of 10^4 to 10^{12} cm^{-3} can generally be measured with an accuracy of ± 20% for most gases. Direct measurements of O, O_2, N_2, He, Ar, N and Ne have been made by OSS. Temperatures are determined to within ± 30° K while winds above 10 m/sec can be measured.

A further detailed description of modes, examples of mass spectra and instrument figures are to be found in the paper by Nier et al., (1973). A discussion of the fly-thru mode has been given by Nier et al., (1974).

C. Internal Structure of the Data

The OSS data words in the UA file are to be found in the 15-second point-by-point records. The header record for each orbit also contains 10 OSS words, which are used for housekeeping information. It is assumed in this writeup that the format of each UA record on the tape supplied by GSFC is to be documented by them. The present description is concerned only with the relationships of the OSS data words within the UA record. The location of these words varies with the satellite and they are not necessarily contiguous.

Table 1 shows the word numbers and word contents for AE-C, -D and -E. They are all floating point (REAL) 32-bit quantities in Xerox Sigma-9 single-precision format. The first five words as well as the seventh are always ambient neutral number densities ($/cm^3$) in the order N_2, O_2, He, O, Ar, N. Usually the sixth word contains the sum $[O_2] + 0.5\,[O]$, called the total $[O_2]$ (hence total $[O] \equiv 2\,[O_2] + [O] = 2 \times$ total $[O_2] = 2 \times$ word six). Word six (also called the select word) may occasionally contain an ambient temperature derived from the experimental fly-thru mode. Again, it is a floating point word, giving temperature in degrees Kelvin. The meaning of word six is determined by a byte in the orbit header.

In all seven words the 8 lowest order (rightmost) bits have been replaced with a percentage error byte. Masking off these bits gives directly the percentage error (P) of the data value. Hence, given a word w, with percentage error P, one may calculate the error Δw, in w as $\Delta w = w \cdot P \cdot 0.01$. P has the effect of introducing 'noise' on the value w, but at the 0.1% level at worst.

Table 2 shows the locations of the OSS UA header record words. Presently only 2 of them are in use - they are to be treated as integers.

Word 91 contains the (modified) Julian date of last revision (DLR) and time of last revision (TLR). This word is updated whenever part of the orbit is reprocessed. DLR is in the upper (leftmost) 14 bits and TLR is in the lower (rightmost) 18 bits.

The Julian date is obtained by masking off the upper 14 bits and adding 70000. The time is obtained by masking off the lower 18 bits and multiplying by 1000. The 10-th word (word 100) is also supposed to contain a system generated revision date. It appears, however, that certain revisions of the UA data base have made this value unreliable and it is recommended that word 91 be used.

Word 92 contains 6 - 4 bit counters in the uppermost 24 bits and the mass identifier of data word 6 in the lower 8 bits. The 6 counters are initially set to zero. Whenever the j-th OSS data word in the UA record for this orbit is revised, the j-th hex digit is incremented by 1. Hence, if orbit 2305 has been written to UA once, and part or all of the UA data has been rewritten twice, the counters will contain 3's for each mass that has been processed. This information is probably not useful to anyone away from the Sigma-9 system. The rightmost 8 bits of word 92 contain the mass number of the data stored in the OSS UA data word 6. It will usually contain the value 32, indicating that total O_2 is to be found in word 6. A value of 49 is used to indicate that word 6 contains ambient temperatures.

At the time of initial submission of data to the Data Center, little data of the later type (49) was present in the files, and investigators should not anticipate its use. Likewise, the direct measurements of O_2 and N (atomic nitrogen) were experimental and the resulting data are found only intermittently in the UA files on AE-C. These data are better obtained from publications of the OSS group.

Table 1. OSS Data Word Locations

OSS Data Word Number	Byte # 0 (0, 1)	Byte # 1 (2, 3)	Byte # 2 (4, 5)	Byte # 3 (6, 7)	Word number in UA File data record: Sat-C	Sat-D	Sat-E
1	Number Density of		N_2	% error	46	49	48
2	"	"	O_2	" "	47	50	49
3	"	"	He	" "	48	51	50
4	"	"	O	" "	49	52	51
5	"	"	Ar	" "	50	53	52
6	"	"	X (Select)	" "	51	54	53
7	Number Density of		N	% error	79	55	54

Table 2. OSS-UA Header Record Words

Byte # →	0		1		2		3		
	0	1	2	3	4	5	6	7	Word Number In Header Record
	Date of Last Revision				Time of Last Revision				91
	C_1	C_2	C_3	C_4	C_5	C_6	Mass of X		92
	not used								93
									94
									95
									96
									97
									98
									99

C_j = revision counters for OSS data words.
Example: If the counters (read as hex digits) have the values 303333, then the densities of N_2, He, O, Ar and X have been written or re-written (all or in part) 3 times. O_2 has not been written for this orbit. The mass of X byte will typically have the value 32 (for total O_2 equivalent density).

D. Data Catalog

It is assumed here that the UA data catalog for all experiments will be included with the data tape. Those investigators with access to the AE Sigma 9 system can generate this catalog using the DMF QUERY program. Table 3 is an example of the catalog for Julian day 74045. Orbit numbers, starting and ending dates and times and the presence of data from each experiment can be determined. OSS data presence is denoted by YES in the column labeled OSS.

Generally, data will be found in the OSS UA words (if YES is indicated) over most of the time interval. There will be exceptions to this rule (gaps) due to many circumstances. These include: lost telemetry in transmission to GSFC, poor quality telemetry words, instrument operations were incompatible with spacecraft operations or altitudes, the instrument was in engineering modes for part or all of the pass, or the instrument was switching modes frequently. It is therefore necessary to read the file on a point-by-point basis to determine whether sufficient data is present for the investigator's needs.

It should be noted that a primary goal of the data processing effort on AE is to provide simultaneous data for specific orbits, not necessarily to reduce telemetry on all orbits. The percentage of orbits reduced by OSS, while large, still reflects this overall philosophy.

```
CUERY
ENTER NAME CF DBI FUNCTION REQUESTED
>+LOCATE
ENTER SATELLITE ID
>+C
ENTER DATA TYPE
>+UA
ENTER START DATE
>+74045
ENTER START TIME
>+0
ENTER END DATE
>+74045
ENTER END TIME
>+0
INPUT 'ALL' TO REQUEST ALL UNIFIED ABSTRACT ENTRIES DURING TIME INDICATED,
INPUT 'ON' FOR ONLINE ENTRIES ONLY, OR INPUT 'SCI' FOR SCIENCE ORBITS ONLY
>+ALL
```

OBJ/SC			DATE/TIMES(SEC)			EXPERIMENTS THAT HAVE PT-BY PT DATA FOR THE ORB											
ORBIT	ORB	LOC	YYDDD/	MMMMM-	MMMMM	BIM	CEP	LEE	MES	MIM	NAC	NAT	OSS	PES	RPA	UVN	VAE
659	S	ON	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.
660	S	ON	74045	11955	13770	YES	YES	YES	YES	.	YES	YES	YES	YES	YES	YES	YES
663	S	ON	74045	34860	37320	YES	YES	YES	.	.	YES	YES	YES	.	YES	YES	.
664	S	ON	74045	42600	45045	YES	YES	YES	YES	.	YES	YES	YES	.	YES	YES	YES
665	S	ON	74045	50340	52785	YES	YES	YES	YES	.	YES	YES	YES	.	YES	YES	YES
666	S	ON	74045	58080	60525	YES	YES	YES	YES	.	YES	.	YES	YES	YES	YES	YES
667	S	ON	74045	66240	68145	YES	YES	YES	YES	.	YES	YES	YES	.	YES	YES	.
669	S	ON	74045	31720	83625	YES	YES	YES	YES	.	YES	YES	YES	YES	YES	YES	YES

```
REQUESTED OUTPUT FINISHED. RESET TO CPT IF NECESSSARY,INPUT CR TO CONTINUE

>+
```

TABLE 3. UA DATA FILE CATALOG

E. Calibration Procedures

A knowledge of instrument calibration procedures is not required for the use of the OSS UA data. Absolute calibration errors are estimated to be a few percent (Nier et al., 1973) and are included in the percentage error estimate which is packed with each data word. While the above reference describes the basic calibration techniques, the reader may be interested in some additional insights gained by the OSS group since that time.

Consistent with the observations of Hedin et al., (1973) atomic oxygen entering the source region of the OSS is found to recombine as O_2 and can be measured as such. The laboratory calibration for molecular oxygen was straightforward and can be used in flight to give accurate indirect measurements of atomic oxygen, provided that a suitable correction for ambient molecular oxygen is applied (see section J). The conversion from O_2 to atomic oxygen is then $[O] = 2\,([O_2]_{measured} - [O_2]_{ambient})$. Because the O recombination is not complete, the actual factor used on AE-C is 2.1. Further analysis of this problem was done by Nier et al. (1976) and French et al. (1975).

The laboratory calibration procedure relates the instrument signal σ_m for a given mass m to a known ambient number density, n_a. For a true closed source instrument in calibration, the source density n_s is given by

$$n_s = n_a \sqrt{T_a/T_s} \quad ,$$

where T_a and T_s are respectively the ambient and source temperatures. The sensitivity S_m can be defined by $\sigma_m = S_m \cdot n_s$. Conversely, in flight σ_m is measured, from which

$$n_a = n_s \sqrt{T_s/T_a} \cdot G$$

$$= (\sigma_m/S_m) \sqrt{T_s/T_a} \cdot G$$

where G is a stagnation factor, also called the source function, dependent on satellite velocity and the angle of attack.

For the OSS, which is a 'quasi-open' source instrument, an additional experiment must be done to determine the effect of the 'openness' and hence a correction to G. This experiment, employing an AE OSS, has been described by Nier et al. (1974) and French et al. (1975). The OSS UA data have been corrected by this factor, which is 1.05 for all masses except He, where the factor 1.26 is required.

Direct comparisons of OSS densities with those of the NACE experiment, and with the mass densities from the MESA experiment, as well as ensemble comparisons with other satellite mass spectrometers (Trinks et al, 1976) give us additional confidence in our absolute density calibrations.

F. Validity of the OSS Data

Generally, when OSS data are present in the UA files, they are valid within the associated percentage error. Therefore, it is important that conclusions drawn from the data are examined in terms of the data accuracy. Our experience has indicated that usually the errors are conservative and may be nearly 2-sigma errors in some cases. Considerations of scale height and density are also important in determining practical limitations to the data. The following summarizes these limits:

Helium: Data from perigee to about 800 km. Densities down to about $10^5/cm^3$ can be measured. The altitude where this density is reached is related to the location of the helium bulge.

Atomic oxygen: Data from perigee to about 600 km. Densities down to about $5 \times 10^6/cm^3$ can be measured. Below this density, source background pressures can become a significant part of the density seen by the instrument.

Molecular nitrogen: Data from perigee to about 550 km. Densities down to about $5 \times 10^4/cm^3$ can be measured.

Argon: Data from perigee to about 180 km. Densities down to about $5 \times 10^6/cm^3$ can be measured. These measurements are usually done on the electrometer detector in the presence of large N_2 and O signals. A small number of 'minor mode' passes have been run where Ar can be measured on the higher sensitivity multiplier detector. In this case argon is measured to about 250 km.

Data which are low density measurements should always be examined by the user to verify that the above limitations are not exceeded. If high accuracy is required, the plotting and examination of altitude profiles may identify marginal points.

The low altitude (perigee to 220 km) atomic oxygen data should receive special attention in applications requiring high accuracy. This data is derived from the mass 32 (O_2) signal in the presence of an ambient O_2 component. Sufficient information on global O_2 densities and a practical means of correcting the mass 32 signal for the O_2 contribution has evolved with the AE-C, D and E missions. OSS UA data written before Jan. 1, 1976 is being rewritten to reflect this new knowledge. Data in the UA file with revision dates before this time (see part C) is not corrected. At 150 km the typical contribution of O_2 will vary from 15 to 40%, increasing with increasing magnetic activity. A further discussion of O_2 densities is to be found in Nier et al. (1974), Nier et al. (1976) and Kayser et al. (1976).

On-line users who find low altitude data where [O] = 2 x word 6 exactly, or where the revision date is before Jan. 1, 1976, (UAQUERY·OSS can be used for this) should request a rewrite by the OSS group. Off-line users may use word 6 and the N_2 density to correct the data as described in this document, part J.

G. Unusual Events Relating to the Experiment

Data users should be reminded that mass spectrometer sources which are initially exposed to reactive atmospheres will undergo a period of surface conditioning in the manner described by Hedin *et al*. (1973) and Nier *et al*. (1977). Because the condition is transient, we have made no special effort to eliminate these effects in the data taken in the first month after launch. As a result, OSS UA data points from this period should not be used for high precision calculations unless the OSS group is consulted.

In the period near orbit 7000 on AE-C the automatic electrometer zeroing circuit reached the limit of its range, thereby inducing a periodically varying bias level on the electrometer data. For a period around orbit 7000 the effect is seen with increasing frequency until operations with the electrometer are curtailed. Data collected on AE-C since this time has been acquired on the main mass multiplier employing the minor mode mass programs. Atomic oxygen and N_2 are not directly obtained in these modes.

H. Known Anomalies in the Data

There are no instrument-generated anomalies of any consequence in the data being delivered to the Data Center. Gain changes in the electrometer circuit occasionally introduce a spurious data point at the telemetry level. Where possible these isolated points have been excluded from the UA averaged data.

On AE-C non-physical variations in the O and N_2 densities will be observed on some orbits for altitudes between 350 and 400 km. The problem is due to automatic data processing, not the instrument. This altitude region corresponds to the overlap range of the high mass multiplier and electrometer. When the electrometer signal reaches a certain value, the multiplier is shut off and a bit is set in the 4-sec instrument subcom. Alternatively, the multiplier will shut itself off at high count rates. Especially on spinning mode passes, the 15 second spin period of the satellite (and hence the signal modulation period) may frustrate the 15 second off constraint in the multiplier control circuitry. The multiplier on-off transients in the data are not always recognized by the data reduction system and abnormal densities are written on occasion.

I. Overall Data Reduction Procedures

Because the OSS UA file data words contain ambient neutral number densities, the user does not have to perform additional data reduction. A complete description of the OSS data reduction procedure is beyond the scope of this document. Below is a brief discussion of the critical steps involved.

Bytes of OSS data are retrieved from the spacecraft telemetry records and combined to give detector signals, housekeeping voltages and command words. Up to three detector signals are obtained for each 1/16 second of operation. Multiplier detector signals are corrected for dead times as obtained in laboratory calibrations. At low altitudes (high source pressures) all detector signals must be corrected for gas scattering effects. At high altitudes some portion of the signal may be due to surface-desorbed gases and approximate corrections are applied: When the satellite is spinning, residual signals are available every 15 seconds and, at least in the case of the OSS geometry, it appears appropriate to subtract the residual signals from the forward facing signals. When the satellite is despun, the residual signals from very high altitudes are subtracted; downleg high altitude points on the downleg, upleg high altitude points on the upleg. Fortunately, 'the quasi-open' source has a high pumping speed and such corrections are usually small on AE-C up to 450 km. Ambient number densities are obtained from the corrected signals as described in part E. The densities are written to a Geophysical Unit File and stored on tape. A separate program reads these files and writes averaged data values into the OSS UA data words.

J. Some Data Analysis Procedures

Initially, because it was anticipated that word 6 (total O_2) of the OSS UA data words would not be used directly by other groups, no correction was made to it for incomplete atomic oxygen recombination. This correction was applied in the computation of word 4 (atomic oxygen). Considerable use has been made of the word 6, however, and some confusion as to its meaning has resulted. We are now rewriting this data with the proper correction, but until this work is completed, the user who needs the highest accuracy must include this step in his calculations, as follows: If the revision date of the orbit (see part C) is before Jan. 1, 1976, multiply word 6 by 1.05.

A similar step may be required for helium in some orbits written to UA before Nov. 2, 1974. These densities must be multiplied by part of the 'openness' correction (see part E) = 1.20.

Before Jan. 1, 1976, the task of correcting the atomic oxygen in word 4 for the presence of ambient molecular oxygen was left to the user. Again, some confusion resulted. We are now rewriting these data with a correction based on our experience on AE-C, D and E (see part F). Following Nier et al. (1976) and Kayser et al. (1976), where N_2 densities are measured along with total O_2,

$$[O] = 2\cdot([\text{total } O_2] - 1.51\text{ E-3}\cdot[N_2]\cdot(N_2\cdot T)^{1/7}).$$

The temperature T used is not critical in this expression, and if no better estimate is available, T = 800 °K is used. The above expression is elaborated somewhat for AE-D and E.

K. References to Papers Relating to the OSS*

I. Publications of OSS Group Alone

Already published:

1. Nier, A. O., W. E. Potter, D. R. Hickman, and K. Mauersberger, "The Open-Source Neutral-Mass Spectrometer on Atmosphere Explorer-C, -D, and -E," Radio Science, 8, 271, 1973.

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3. Mauersberger, K., M. J. Engebretson, W. E. Potter, D. C. Kayser, A. O. Nier, "Atomic Nitrogen Measurements in the Upper Atmosphere," Geo. Res.Ltrs., 2, 337, 1975.

4. Mauersberger, K., D. C. Kayser, W. E. Potter, and A. O. Nier, "Seasonal Variation of Neutral Thermospheric Constituents in the Northern Hemisphere," J. Geophys. Res., 81, 7, 1976.

5. Nier, A. O., W. E. Potter, and D. C. Kayser, "Atomic and Molecular Oxygen Densities in the Lower Thermosphere," J. Geophys. Res., 81, 17, 1976.

6. Mauersberger, K., M. J. Engebretson, D. C. Kayser, and W. E. Potter, "Diurnal Variation of Atomic Nitrogen," J. Geophys. Res., 81, 2413, 1976.

7. Mauersberger, K., W. E. Potter, and D. C. Kayser, "A Direct Measurement of the Winter Helium Bulge," Geo. Res. Ltrs., 3, 269, 1976.

8. Mauersberger, K., A. O. Nier, D. C. Kayser, W. E. Potter, and M. J. Engebretson," Determination of Exospheric Neutral Gas Temperatures," Geo. Res. Ltrs., 3, 273, 1976.

9. Kayser, D. C., and W. E. Potter, " Molecular Oxygen Measurements at 200 km from AE-D Near Winter Solstice, 1975," Geo. Res. Ltrs., 3, 455, 1976.

In press or submitted for publication:

10. Potter, W. E., D. C. Kayser, and K. Mauersberger, "Direct Measurements of Neutral Wave Characteristics in the Thermosphere," accepted for publication in J. Geophys. Res.

11. Engebretson, M. J., K. Mauersberger, D. C. Kayser, W. E. Potter, and A. O. Nier, "Empirical Model of Atomic Nitrogen in the Upper Thermosphere," accepted for publication in J. Geophys. Res.

*As of October 13, 1976

12. Potter, W. E., and D. C. Kayser, "In Situ Measurements of Neon in the Thermosphere," accepted for publication in Geo Res. Ltrs.

13. Nier, A. O., "The Study of Planetary Atmospheres with Mass Spectrometers Carried on High Speed Probes or Satellites," accepted for publication in Proc. of Rarified Gas Conf., 1977.

14. Mauersberger, K., M. J. Engebretson, W. E. Potter, D. C. Kayser, and A. O. Nier, "Atomic Nitrogen Measurements in the Upper Thermosphere," accepted for publication in Space Res.

II. Publications in Collaboration with Other Groups

Already published:

1. Torr, M. R., D. G. Torr, J. C. G. Walker, P. B. Hays, W. B. Hanson, J. H. Hoffman, and D. C. Kayser, "Effects of Atomic Nitrogen on the Nocturnal Ionosphere," Geo. Res. Ltrs., 2, 385, 1975.

2. Brinton, H. C., H. G. Mayr, and W. E. Potter, "Winter Bulge and Diurnal Variations in Hydrogen Inferred from AE-C Composition Measurements," Geo. Res. Ltrs., 2, 389, 1975.

3. Reber, C. A., A. E. Hedin, D. T. Pelz, W. E. Potter, and L. H. Brace, "Phase and Amplitude Relationships of Wave Structure Observed in the Lower Thermosphere," J. Geophys. Res., 80, 4576, 1975.

4. Torr, D. G., M. R. Torr, D. W. Rusch, P. B. Hays, K. Mauersberger, J. C. G. Walker, N. W. Spencer, A. E. Hedin, H. C. Brinton, and R. F. Theis, "Atomic Nitrogen Densities in the Thermosphere," Geo. Res. Ltrs., 3, 1, 1976.

5. Mayr, H. G., P. Bauer, H. C. Brinton, L. H. Brace, and W. E. Potter, "Diurnal and Seasonal Variations in Atomic and Molecular Oxygen Inferred from Atmosphere Explorer-C," Geophys. Res. Ltrs., 3, 77, 1976.

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In press or submitted for publication:

7. Breig, E. L., W. B. Hanson, J. H. Hoffman, and D. C. Kayser, "In-situ Measurements of Hydrogen Concentration and Flux between 160 and 300 km in the Thermosphere," accepted for publication in J. Geophys. Res.

8. Torr, D. G., M. R. Torr, J. C. G. Walker, A. O. Nier, L. H. Brace, and H. C. Brinton. "Recombination of O_2^+ in the Ionosphere," submitted to J. Geophys. Res.

9. Trinks, H., H. G. Mayr, D. C. Kayser, and W. E. Potter, "Auroral Energy Deposition and Neutral Composition Changes Observed Simultaneously by ESRO 4 and AE-C at Different Altitudes," accepted for publication in J. Atmos. Terr. Phys.

10. Marcos, F. A., K. S. W. Champion, W. E. Potter, and D. C. Kayser, "Density and Composition of the Neutral Atmosphere at 140 km from the Atmosphere Explorer-C Satellite Data," submitted to Space Res.

11. Hedin, A. E., J. E. Salah, J. V. Evans, C. A. Reber, G. P. Newton, N. W. Spencer, D. C. Kayser, D. Alcayde, P. Bauer, L. Cogger, and J. P. McClure, "A Global Thermospheric Model Based on Mass Spectrometer and Incoherent Scatter Data: MSIS Part 1 - N_2 Density and Temperature," submitted to J. Geophys. Res.

12. Hedin, A. E., C. A. Reber, G. P. Newton, N. W. Spencer, H. C. Brinton, H. G. Mayr, and W. E. Potter, "A Global Thermospheric Model Based on Mass Spectrometer and Incoherent Scatter Data: MSIS Part 2 - Composition," submitted to J. Geophys. Res.

13. Trinks, H., C. A. Reber, A. E. Hedin, N. W. Spencer, D. Krankowsky, P. Lämmerzahl, D. C. Kayser, A. O. Nier, and U. von Zahn, "Intercomparison of Neutral Composition Measurements from the Satellites ESRO 4, AEROS-A, AEROS-B and AE-C, submitted to J. Geophys. Res.

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1. Dalgarno, A., W. B. Hanson, N. W. Spencer, and E. R. Schmerling, "The Atmosphere Explorer mission," Radio Science, 8, 263-266, 1973.

2. French, J. B., N. M. Reid, A. O. Nier, and J. L. Hayden, "Rarified gas dynamic effects on mass spectrometric studies of upper planetary atmospheres," AIAA Journal, 13, 1641, 1975.

3. Hedin, A. E., B. B. Hinton, and G. A. Schmitt, "Role of gas-surface interactions in the reduction of Ogo-6 neutral particle mass spectrometer data," J. Geophys. Res., 78, 4651, 1973.

MIMS NSSDC DOCUMENTATION

A. Summary of the Rationale and Motivation for the Experiment.

An ion-mass spectrometer is an instrument which samples ions from the ionosphere in the vicinity of the spacecraft and measures the concentration of each species. The Atmosphere Explorer (AE) ion-mass spectrometer is basically a magnetic deflection-type, similar to the one flown on the ISIS-2 spacecraft, but with a mass range from 1 to 90 amu divided into three sections scanned simultaneously. Sensitivity of the instrument is better than 1 ion cm^{-3} for low masses and several ions per cubic centimeter for the upper end of the mass range.

The main objective of the experiment is to determine the abundance of each ion species as a function of position of the satellite. This information is essential to the understanding of the chemistry, dynamics, and heat budget of the upper atmosphere. Also of interest is the behavior of the meteoritic ions near the magnetic equator where it appears that the presence of Fe^+ ions is somehow related to the occurrence of spread-F. Measurement of the phase shift from the nominal ram position of the roll modulation maximum of each individual ion current yields the vertical-drift velocity for that species. This information is applicable to polar-wind studies and in the evaluation of the magnitude of interhemisphere plasma transport along magnetic field lines.

B. Description of Instrument.

The magnetic ion mass spectrometer (MIMS) measures the abundances of the ambient positive ions along the orbit of the AE satellite. It scans the mass range from 1 to 90 amu, or portions of that range, depending on the operational mode. The instrument consists of an entrance aperture, a 7 cm screen, flush mounted to the surface of the spacecraft, a set of collimating slits, a magnetic analyzer and a triple detector system, each detector consisting of a collector slit, an electron multiplier and a log amplifier. Positive ions are rammed through the entrance grid due to the orbital motion of the spacecraft and accelerated through the collimator forming a beam which enters the magnetic analyzer. This analyzer consists of a permanent magnet with a field strength of 3600 gauss in the gap. Three ion beam trajectories are allowed through the magnet. These split the ion beam into 3 parts in the mass ratio 1:4:16. Collector slits are placed at the exit of the magnetic lens system corresponding to the image point of the allowed ion trajectories. As the ion accelerating voltage is varied, the ion beams are scanned across the collector slits forming a series of peaks in the ion current detector. The mass ranges covered are 1 to 4, 4 to 16 and either 16 to 90 (AE-C) or 14 to 72 (AE-D) amu at the low, mid and high mass collectors respectively. The scan times are either 4 sec (AE-C) or 2 sec (AE-D) for the analog short mode, or 8 sec for the analog long mode. When the analog short mode is used, the mass ranges of each channel are cut in half. The analog short mode is used when the satellite is spinning; the analog long for despun operation.

The overall accuracy is better than 20%, except in very disturbed regions of the ionosphere, or at extremely low densities. Sensitivity of the instrument is somewhat mass dependent, varying from 1.0 ion cm^{-3} for H^+, to ~10 ions cm^{-3} for O^+.

C. Description of Data.

The tapes are produced for the whole project by the GSFC Sigma 9 computer group of the AE project. The tape format of the UA data should be common to all experiments.

The MIMS data format in the UA file consists of the concentration of 16 ion species as a function of UT. These occur at the 00, 15, 30 and 45 sec times of each minute. The data points are interpolated from the nearest measured values, which for despun data occur every 2, 4 or 9 seconds, depending on instrument mode, and for spinning data once each satellite spin period (usually 15 seconds.)

The abstract file contains comprehensive data for the concentrations of the following principal ion species: H^+, He^+, N^+, O^+, Mg^+, N_2^+, NO^+ and O_2^+. Data are also available for the concentrations of the minor ions, D^+ and O^{++}, for the restricted ranges of geophysical conditions where their abundance is above the instrument threshold for reliable measurement. Particle concentrations are presented in units of ions per cm^3.

D. A Catalog of Data

See Datastat File

E. Instrument Calibration

An ion-mass spectrometer measures relative abundances of the ions in samples from the ionosphere but can be calibrated, as described below, to give absolute ion concentrations.

Several laboratory calibrations were performed as follows: instrumental mass-discrimination factors were measured by determining the ratios of gases in standard known mixtures. Conversion of output voltage (V) from the log amplifiers to input current (I) was accomplished thru the relationship

$$I = Ae^{CV} - B$$

where A, B, and C are constants determined by passing known currents into the amplifiers.

A special feature of the Magnetic Ion-Mass Spectrometers (MIMS) on the AE satellites concerns their inflight calibration. This calibration was accomplished through software interaction with data analysis procedures for the onboard Retarding Potential Analyzer (RPA). The sum of the measured ion currents for the molecular species, N_2^+, NO^+ and O_2^+, were compared with the corresponding unresolved molecular concentrations from the RPA over the altitude range 200-250 km. A comparable comparison was carried out for the sum of N^+ and O^+ near the F peak. H^+ and He^+ calibrations were accomplished at altitudes above 500 km under those select conditions where the ions contributed distinctive features to the current-voltage output characteristics of the RPA. Calibration was thus performed for an extensive set of satellite orbits which span the full time of the AE mission. In this complementary manner, the two instruments (i.e., the MIMS and RPA) have supplied absolute ion concentrations for which the accuracy is limited only by the spectrometer's ability to measure the concentration ratios and the analyzer's ability to measure the concentrations of the sums of these ions. Overall accuracy is expected to be better than 10% for the major ion species. Calibrations for minor constituents were done by interpolation of the data related to the major peaks with an expected accuracy of ±20%.

F. Scientific Areas Where Data are Known to be Excellent or Invalid.

The MIMS experiment has supplied ion composition data which has been used quite extensively in models to explain, for example, the N^+ distributions in the ionosphere, to determine rate coefficients of reactions like $N_2^+ + O$ and the recombination of NO^+ in the ionosphere, and the formation of O_2^+ by charge exchange with metastable O^+. Also the diurnal variation of NO^+, O_2^+, and O^+ in the lower thermosphere and the daytime chemistry of NO^+ have been studied using the MIMS data.

Studies have also been carried out on the distributions of hydrogen and deuterium determined through the charge exchange reactions of atomic oxygen with H^+ and D^+ respectively. Measurements of the H^+ concentrations below 200 km, combined with data from other AE instruments, were used to evaluate the vertical hydrogen flux. The results indicate upward daytime fluxes well in excess of that needed to offset the normal planetary losses due to evaporative escape, and suggest that some other loss or global redistribution process controls the thermospheric distribution of hydrogen. H^+ data from circular orbits have been used to derive, in a direct manner, the diurnal and seasonal variabilities of hydrogen. Winter enhancements and summer depletions are observed, along with a diurnal variation which ranges from 2 to 3 between the winter and summer hemispheres.

A special mode of increased sensitivity has proven useful in studies of minor atmospheric ions. D^+ concentration data have yielded information on the D/H ratio and the daytime abundance of deuterium to altitudes below 300 km. A relative enhancement of deuterium has been observed in the thermosphere. Low altitude data for O^{++} have established reaction with atomic oxygen as the principal chemical loss process; data analysis also has provided an estimate of the reaction rate. In addition, evidence has been obtained for a low altitude X-ray source of O^{++} in the thermosphere.

The ion compositon signatures of equatorial "bubbles" has given information on the plasma dynamics of the bubble phenomenon. The composition in bubbles is in general typical of that found several hundred km below the bubble altitude. Simple calculations show that recombination alone cannot produce the observed signatures; relatively rapid vertical plasma convection is required. The ion drift meter shows that upward velocities of 100- to 200- m sec^{-1} exist, and the MIMS data indicate that velocities of this magnitude persist for times of the order of 20 min to one hour in bubbles.

The existence of meteoritic ions, Mg^+ and Fe^+, in the equatorial region has been confirmed by the MIMS experiment. In the polar regions, areas have also been found where Mg^+ is the dominant ion species near 150 km at [illegible] hrs local time.

G. Unusual Events

From orbits 2700 to 2760 and 3244 to 3491 the MIMS instrument was in a high sensitivity mode. The resulting order of magnitude increase in sensitivity has resulted in high quality data for many of the minor ion species, e.g. D^+ and O^{++}, to very low altitudes.

The data set includes several despun orbits where the MIMS instrument was directed either backwards toward the wake, or at an extremely large angle relative to ram. The light H^+ ions are readily observed in such a configuration; although the concentrations so deduced from the data are not indicative of the true ambient H^+ concentrations, these data may be of scientific value in investigations of the spacecraft plasma sheath. The following orbits are known to fall into this category: 527, 549, 563, 567, 571, 782, 785, 786, 787, 788, 791, 804, 807, 808, 809, 810, 813 and 826. However, any such orbits are most readily identifiable, since H^+ is the only observable ion below 1000 km.

Occasional "flyers" or "spikes" sometimes appear in the data; in such instances the concentration of a species at an isolated point could be several orders of magnitude greater than at a neighboring point. Examples exist on orbits 585, 628, 650 and 741. As variations of this amount could sometimes be real (e.g. in the polar regions or during spread-F) no attempt has been made to systematically eliminate all of it from the data base. However, the identification of possible spurious signals should be apparent to even the least-informed user of the data.

H. Known Anomalies.

See Section G.

I. Data Reduction Procedure.

The data presented in the UA file are reduced to ion concentrations with all known corrections applied. They may be considered the absolute ion concentrations at the times indicated at the position of the satellite.

J. Discussion of Procedures.

See Section I.

K. References.

1) The Magnetic Ion-Mass Spectrometer on Atmosphere Explorer, J. H. Hoffman, W. B. Hanson, C. R. Lippincott and E. E. Ferguson, Radio Sci., 8, 315-322, 1973.

2) In Situ Measurements of Hydrogen Concentration and Flux Between 160 and 300 km in the Thermosphere, E. L. Breig, W. B. Hanson, J. H. Hoffman and D. C. Kayser, J. Geophys. Res., 81, 2677-2685, 1976.

3) Doubly-Charged Atomic Oxygen Ions in the Thermosphere, I. Photochemistry, E. L. Breig, Marsha R. Torr, D. G. Torr, W. B. Hanson, J. H. Hoffman, J.C.G. Walker, and A. O. Nier, J. Geophys. Res., 1977, in press.

4) Deuterium in the Daytime Thermosphere, in preparation.

5) Minor Species and Other Aeronomic Studies, E. L. Breig, presented at Atmosphere Explorer Symposium, Bryce Mountain, Va., October, 1976.

6) Sample Ion Composition Results from the AE Magnetic Ion Mass Spectrometer, J. H. Hoffman, presented at Atmosphere Explorer Symposium, Bryce Mountain, Va., October, 1976.

L. Other Known Conditions in Data.

NONE

328958

55

AE-C 73-101A-01
AE-E 75-107A-09A

DATA CENTER DOCUMENTATION

Atmosphere Explorer

Neutral Atmosphere Temperature Experiment (NATE)

Rationale for the Experiment

The Neutral Atmosphere Temperature Experiment (NATE) was designed to measure the kinetic temperature of the neutral gas at the spacecraft. Its design was based upon a technique first employed on the San Marco III (a and b) satellites, and later the Aeros I and II satellites (Ref). The measurement approach is based upon the concept that the neutral particles, in this case N_2, are in thermal equilibrium, and hence a measure of their velocity distribution permits a kinetic temperature calculation. The desirability of measuring the local kinetic temperature seems obvious - it is a basic parameter in atmospheric studies, and it reflects local conditions of thermodynamic equilibrium and hence the local dynamic situation. Most previous temperature measurements have in fact been derived from density measurements, from the density scale height, from ion temperature, or optically by observation of line widths. Recent Aeros data analysis reveal temperature derived from density does not always faithfully reflect the true temperature of the gas - particularly at times when a geomagnetic disturbance is influencing the atmosphere (Ref).

The NATE also provided measurements of the composition, when commanded into the appropriate mode and, for the first time, measurement of the local wind:

AE-C Vertical motions

AE-D, E Vertical motions and horizontal (normal to orbit plane) winds.

Instrument Description

The basic instrument is a quadrupole mass spectrometer with a gas sampling spherical antechamber. The sampling is accomplished through a small knife-edged orifice with an area that is approximately 1% of the antechamber spherical surface, to insure that the gas reaches equilibrium temperature (with the antechamber) before measurement. Temperature is determined by measurement of the changing density of the N_2 gas in the antechamber as the spacecraft spins, or alternatively from the modulation caused by a scanning baffle when the spacecraft is despun. In the spinning mode, temperature is derived from the modulation caused by stream interception by a fixed baffle. The details of the technique are discussed in the reference (Ref).

The wind values are determined by measurement of the "stream" position relative to the satellite velocity. A null measurement permits a readily computed stream direction and, hence, by subtracting the spacecraft velocity, a wind measurement. A vertically scanning baffle leads to measurements of the vertical motion, and a horizontally scanning baffle leads to measurements of the horizontal wind - normal to the orbit plane. No measurement of the component in the direction of satellite motion, in the orbit plane, is possible with the AE instrumentation. The reference provides details of the wind measurement technique and errors for vertical motions.

Data Format

A physical description of the tape is given in another part of the documentation to be provided by the Information Processing Division. The data from the NATE instrument appears in words 41-45 of the records on that tape. Word 41 is the neutral gas temperature in degrees Kelvin. The remaining words are the concentrations in number/cc of molecular Nitrogen, total Oxygen (O_2 + 2 O), Helium, ~~atomic Oxygen~~ and Argon. These values are all represented as binary floating point numbers. Whenever any of the values is not being measured, a zero has been put in the position. For AE-D the NATE words occur in position 42-46. In addition, word 47 on AE-D contains the zonal wind in meters/sec, with positive wind eastward. For AE-E word 46 contains the approximate meridional wind in meters/sec. In that case southward is positive. The actual wind component measured is normal to the vehicle direction of motion at the time of the measurement.

Instrument Calibration

Calibration of the instrument for temperature and wind measurements is not required since these data are computed from changes in the local density due to modulation by either spacecraft spin motion or baffle motion.

Calibration of the mass spectrometer for use in the composition mode was accomplished on a conventional vacuum system. Variations in calibrations in orbit due to multiplier gain changes normally experienced have been accounted for in the data. It should be assumed that the accuracy of the data in the composition mode is better than 25%. In many cases it is much better but at times may be worse. Time has not permitted evaluation of each data set in the file. Questions relative to particular data sets, particularly if they appear to be "unreasonable", should be addressed to the P.I.

Comments on Wind and Temperature Validity

It should be recognized that the wind and temperature data in the file are "new" data and reflect phenomena not generally observed previously by satellite. The variations observed reflect, it is believed, true variations of wind and kinetic temperature. However, sufficient analyses have not yet been accomplished nor has there been sufficient correlation with related phenomena to fully establish the validity of the data. Thus there is no known significant discrepancy in the data, however, no proof of the validity has yet been identified. Nevertheless, there has been sufficient study and comparison with related phenomena to convince the investigator that the data are valid. Error analysis conducted to date confirm that the values are valid to a few percent (Ref). Random variations in density have been shown to have an insignificant effect upon the temperature and wind data. As discussed in the reference, uncertainty in the average value of the spacecraft roll position precludes confidence in the average value of the vertical winds, however, because of the much greater magnitude of the orbit normal component usually observed, one can have confidence in the absolute value of the horizontal component.

Data Reduction

The data reduction procedure involves several distinct processes. The procedure used to derive the composition measurements is the same as used in the NACE experiment which is discussed in the documentation for that instrument.

First, the data are read using subroutines provided on the Sigma 9 computer. The instrument mode readout is then checked to see if the instrument is being operated in a mode in which the gas temperature may be derived. The following operating modes lead to useful temperature measurements:

1. Satellite despun, baffle scanning.
2. Satellite spinning, baffle fixed in front of orifice.
3. Satellite spinning, baffle stowed.

After the mode determination the data is checked for the presence of drop outs and a dead time correction is applied. Further data reduction is abandoned if excessive data drop outs occur.

Next a density gradient correction is applied to the data. This is done by fitting a quadratic to the portions of the data which are not dependent on the gas temperature. In the spinning mode the data are independent of the gas temperature from approximately 20° to 80° angle of attack. In the despun mode the data are independent of gas temperature whenever the baffle is at one of the extreme positions in its scan.

To perform the analysis when the baffle is being used we establish a series of sums which we call moments. These sums are formed from θ_i and W_i. The quantity θ_i is just the time of each data point measured from an arbitrary reference position. W_i is the difference between each data point and the value of the quadratic used for gradient correction at that point. The first moment R_1 is just the sum of W_i over the data. This moment is nearly independent of temperature or wind and can be used to normalize the remaining moments. R_2 is the sum of the squares of W_i divided by R_1 squared. This moment is highly dependent upon the gas temperature. θ_1 is the sum of the product of $\theta_i \times W_i$ divided by R_1. This moment defines the position of the baffle wake with regard to the arbitrary reference mentioned above and leads to a measurement of the local wind. θ_2 is the product of W_i times a θ_1 dependent weight function divided by R_1. The constants in the weight function are chosen to enhance the dependence of this moment on the gas temperature. Different constants are used for the different baffle configurations. To convert these moments to the gas temperature and wind we have systematically calculated a set of W_i encompassing all conditions expected to be encountered in orbit. The moments were then formed and fitted to multi-dimensional Taylor's series.

Finally, orbit and attitude data are read in to enable a conversion to winds in an earth oriented reference frame.

When the baffle is not in use the gas temperature may be determined when spinning using the region near 90° angle of attack. At 90° particles enter the orifice because of their transverse thermal motions. These thermal motions are only important in a small angular region approximately 15° wide centered on 90°. The technique used to determine the temperature depends on the fact that the sum of the data points over this interval minus the sum of a calculation of the value those points would have if thermal motions were set to zero, is a simple function of the gas temperature.

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Duplicate in DRF B28959

AE-C 73-101A-11(A)
AE-E 75-107A-10A

DATA DOCUMENTATION PACKAGE

for the

NATIONAL SPACE SCIENCE DATA CENTER

Instrument: Bennett Ion Mass Spectrometer

Spacecraft: Atmosphere Explorer-C

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I. Rationale for Measurement

The overall science objective of the Atmosphere Explorer missions, to study the response of the earth's atmosphere to solar radiation, requires the simultaneous measurement of a number of fundamental atmospheric parameters. One of these parameters is ion composition, since the ionized component of the atmosphere is a direct result of solar irradiation. The Bennett ion mass spectrometer on AE-C measures the individual concentrations of thermal positive ions in the mass range 1 to 72 amu and number density range 8×10^1 to 5×10^6 ions cm^{-3}.

II. Instrument Description

The spectrometer is mounted on the lower baseplate of the AE-C spacecraft and looks forward (in the direction of motion) along the +X axis in the despun spacecraft mode. The instrument consists of an ion analyzer of the Bennett type and associated electronics. Mass analysis is performed by DC and RF potentials applied to sixteen parallel tungsten-mesh grids. Ambient ions entering the instrument are accelerated down the axis of the spectrometer by a DC sweep potential. For each ion mass there is a value of this potential which accelerates the ion to the instrument's resonant velocity. Resonant ions which transit the first analyzer stage in phase with the applied RF gain sufficient energy from the RF field in all three stages to penetrate a retarding DC field and reach the collector, where a current proportional to the ambient concentration of the resonant ion is detected by an amplifier system covering the range 5×10^{-14} to 5×10^{-8} amp.

MEASURED PARAMETERS:

Primary instrument output data, produced by a peak detector circuit, consist of two digital words: one indicates the measured current and the other the sweep potential for each ion detected. The ambient concentration and identity of each ion in the mass range 1-72 amu are derived from these data. In addition, the ion current spectrum appearing at the output of the amplifier chain is telemetered in analog form.

TEMPORAL RESOLUTION:

The instrument employs three RF frequencies, each corresponding to a range of ion mass: 1-4 amu, 2-18 amu, and 8-72 amu. Any combination of one or more ranges may be selected by command; each is swept in 1.7 sec. The resolution of the ion measurements depends on the selected mass scan mode and on whether the spacecraft is spinning or despun. For the despun case, when a single mass range has been selected, the concentration of a given ion is measured every 1.7 seconds, corresponding to about 12 km along the orbit. When the full mass range (1-72 amu) is scanned, the measurement is repeated every 5.1 seconds. In the spacecraft spinning mode, ram measurements are spaced 15 seconds apart.

ADDITIONAL INFORMATION:

A more complete description of the instrument may be found in Radio Science, 8, 323-332, April 1973.

III. Description of Data

The Bennett ion mass spectrometer (BIMS) data are included in the AE-C Unified Abstract File database; a copy of this database, in magnetic tape form, is being submitted to the NSSDC.

The BIMS data in the UA file are derived by time-smoothing the Geophysical Unit File data produced by the instrument. While the GU data have a variable time resolution (depending upon spacecraft spin and BIMS instrument mode) the UA data are on 15-second centers. The BIMS words in the UA file are Words 1 thru 10; they contain the following data:

474 1-48
Record
48-57

Word 1 H^+ concentration (ions cm^{-3})

Word 2 He^+ concentration (ions cm^{-3})

Word 3 N^+ concentration (ions cm^{-3})

Word 4 O^+ concentration (ions cm^{-3})

Word 5 N_2^+ concentration (ions cm^{-3})

Word 6 NO^+ concentration (ions cm^{-3})

Word 7 O_2^+ concentration (ions cm^{-3})

Word 8 Total ion concentration (ions cm^{-3})

Word 9 Spare

Word 10 Spare

IV. CATALOG OF DATA

The initial AE-C UA File submission to the NSSDC includes data taken during the month of February 1974 when the satellite was in its eccentric orbit phase. Data were acquired on both spinning and despun passes, generally below 1000 km altitude; perigee was ∿150 km.

BIMS data in this February 1974 dataset includes ion composition measurements made on 36 despun orbits and 35 spinning orbits.

V. INSTRUMENT CALIBRATION

The reduction of ion mass spectrometer data requires the conversion of measured ion currents to ambient ion concentrations. This process, for the BIMS instrument, consists of converting directly from current to number density via a mathmetical expression involving instrument geometry, laboratory and in-flight calibration factors, and spacecraft orbit and attitude data.

For conditions of zero or slightly negative spacecraft and spectrometer orifice potential, small angle of attack, small Debye length, and ion thermal velocity less than or comparable to the satellite velocity, the relationship between measured current, I, and ambient concentration, N, for each ion detected is given by

$$I = NevA\alpha$$

where e is the electronic charge, v is the satellite velocity, A is the spectrometer orifice area and α is the spectrometer efficiency.

Thus, the number density of a particular ion can be derived directly from its measured ion current, assuming that spacecraft orbit/attitude information is available and that the instrument factor α has been determined by laboratory and in-flight calibration.

Spectrometer Efficiency Factor α:

Spectrometer efficiency is defined as the ratio of resonant ion current reaching the collector to the total current of resonant mass ions entering the instrument. As described in the Radio Science (8, 323, 1973) paper, α is a function of the retarding potential V_s; V_s regulates α by controlling the duty cycle, or on-time, of the ion analyzer.

As part of the laboratory calibration of the BIMS instrument an ion flux of known magnitude is directed into the spectrometer orifice, V_s is scanned, and the variation of collected ion current is observed. Both the absolute value of α and its variation with V_s are thereby determined. After the instrument is in orbit, in-flight V_s calibrations are performed under conditions of near-constant input ion flux, to verify the form of the α versus V_s curve. This test also verifies that the effective V_s is reduced by the incoming energy (due to spacecraft velocity) of the ion being measured; a simple correction for this effect is made in the interpretation of flight data.

Interpretation of Spin-Mode Data:

At the nominal spacecraft spin rate of 4 revolutions per minute the angle between the spectrometer analyzer and the satellite-velocity vector changes at a rate of 24° sec^{-1}. The scan of a single mass range (1.7 sec.) occurs, then, within $\pm 20^{\circ}$ of the velocity vector; the scan of multiple mass ranges results in a proportionately larger range of attack angle. As part of the data reduction process, ion currents measured at nonzero angles of attack are corrected to ram values. The correction factors have been empirically determined from AE-C flight data.

VI. Accuracy of Ion Concentrations

The BIMS data in the AE-C UA file have been derived using the laboratory and in-flight calibration techniques described briefly in Section V. However, extensive comparisons have been made between BIMS ion concentrations and those measured simultaneously by the CEP and MIMS/RPA instruments. Based on these comparisons, it appears that for despun orbits, the BIMS measurements of H^+, O^+, NO^+, O_2^+ and N_2^+ are, in general, accurate to ±20%. The ions He^+ and N^+ are usually minor constituents, and hence comparison among the three instruments for these ions has been less conclusive.

Because of (a) the inherently poorer time resolution of spin-mode data, and (b) the angle-of-attack correction made to spin-mode measurements, the BIMS ion concentrations in the UA file for spacecraft-spinning orbits are subject to greater error than for despun orbits. Also, because of instrument mode changes and phasing of the BIMS angle-of-attack, there are gaps in the UA data for certain ions on some spin-mode orbits.

VII. Discussion of Anomalies

The principal anomaly which occurred in the operation of the AE-C BIMS instrument was an amplifier baseline offset which limited amplifier sensitivity at altitudes below ∿220 km. This limitation, which was successfully removed from the AE-E instrument by electronic modification, was apparently caused by impact ionization of the dense neutral atmosphere entering the BIMS instrument at high velocity (~8 km/sec.). The effect of the baseline offset was to prevent the measurement, below ~220 km altitude, of ion constituents whose density was lower than ~10^3 ions cm^{-3}.

VIII. Data Reduction Procedure

The BIMS data processing system is designed to convert the digital outputs of the instrument into mass and concentration of positive ions, calculate experiment monitors, compute and merge orbit/attitude data with the experiment data, create a Geophysical Unit (GU) file, and produce Unified Abstract (UA) data for each orbit.

Figure 1 shows a graphic overview of the BIMS data system. The system is composed of three data analysis programs (F4 program, Despun Cleanup program, Spin Mode Cleanup program), a program which produces Unified Abstract data (F8 program), and two printer plot modules (GU Printer Plot program, UA Printer Plot program). They are written in FORTRAN IV and run on the Xerox Sigma 9 AE central computer system at the Goddard Space Flight Center.

As indicated in Figure 1, the processing flow begins with the F4 program. This program accesses the raw telemetry data (one major frame at a time) and orbit/attitude data for the orbit to be processed, and performs the following major functions:

- Organize raw telemetry data into sweeps
- Calculate ion mass and current for each peak in the sweep
- Calculate orbital parameters and associate these data with ion peaks.

- Compute experiment monitors and identify these with each sweep and peak.
- Produce a temporary Geophysical Unit (GU) file with a record for each sweep, each record containing peak information, orbital parameters, and experiment parameters for the sweep.

The next step in the system is the processing of the temporary GU file by either the Despun Cleanup program or the Spin Mode Cleanup program, depending on whether the orbit being processed is despun or spinning. These programs do the following tasks:

- Apply a series of tests which account for special instrument and spacecraft conditions, making appropriate modifications to the current associated with each peak in the temporary GU file.
- Calculate ion concentration for every ion mass in each sweep.
- Produce final GU file

After the final GU file has been created, the temporary GU file (previously produced by the F4 program) is deleted from the system. The final GU file is now processed by the F8 program, which does the following:

- Interpolate ion concentrations at 15 second intervals for each of the seven major ion constituents (H^+, He^+, N^+, O^+, N_2^+, NO^+, O_2^+), and for as many as three specially selected ions (presently BIMS total concentration).

- Write the interpolated concentrations onto the Unified Abstract (UA) file, where it may be accessed by all experimenters.

At this point in the processing, two plot programs are executed in sequence. The GU Printer Plot program reads the GU file and produces plots of ion concentration versus universal time. The UA Printer Plot program accesses the UA data produced by the F8 program, and produces a concentration versus universal time plot showing each of the BIMS ion masses in the UA file.

The final step in the BIMS data processing flow is the "demotion" of the GU file onto magnetic tape for permanent storage. The entire system, from F4 program to demotion of the GU file, typically requires 3 to 4 minutes of CPU time to process a 35 minute pass.

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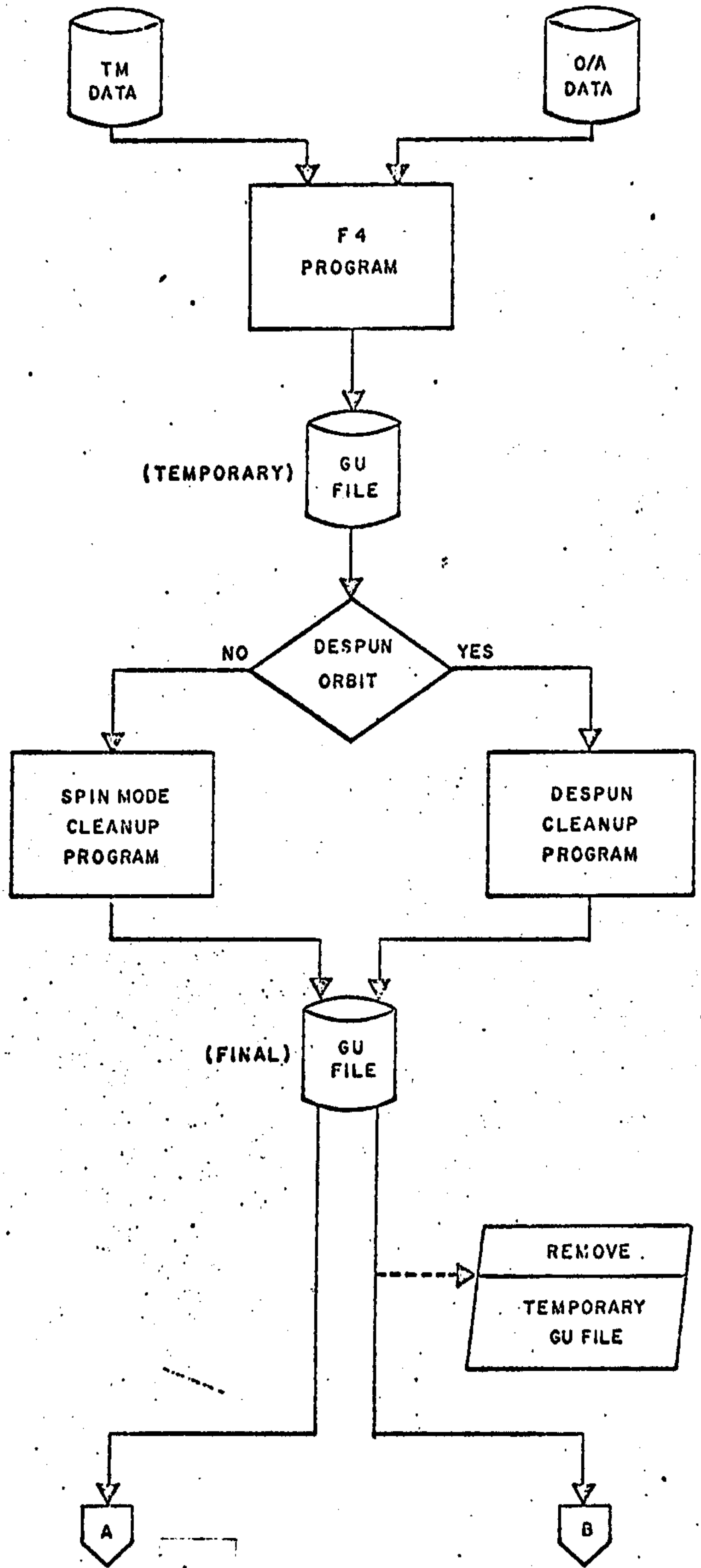

Figure 1. BIMS Data Processing System (1 of 2)

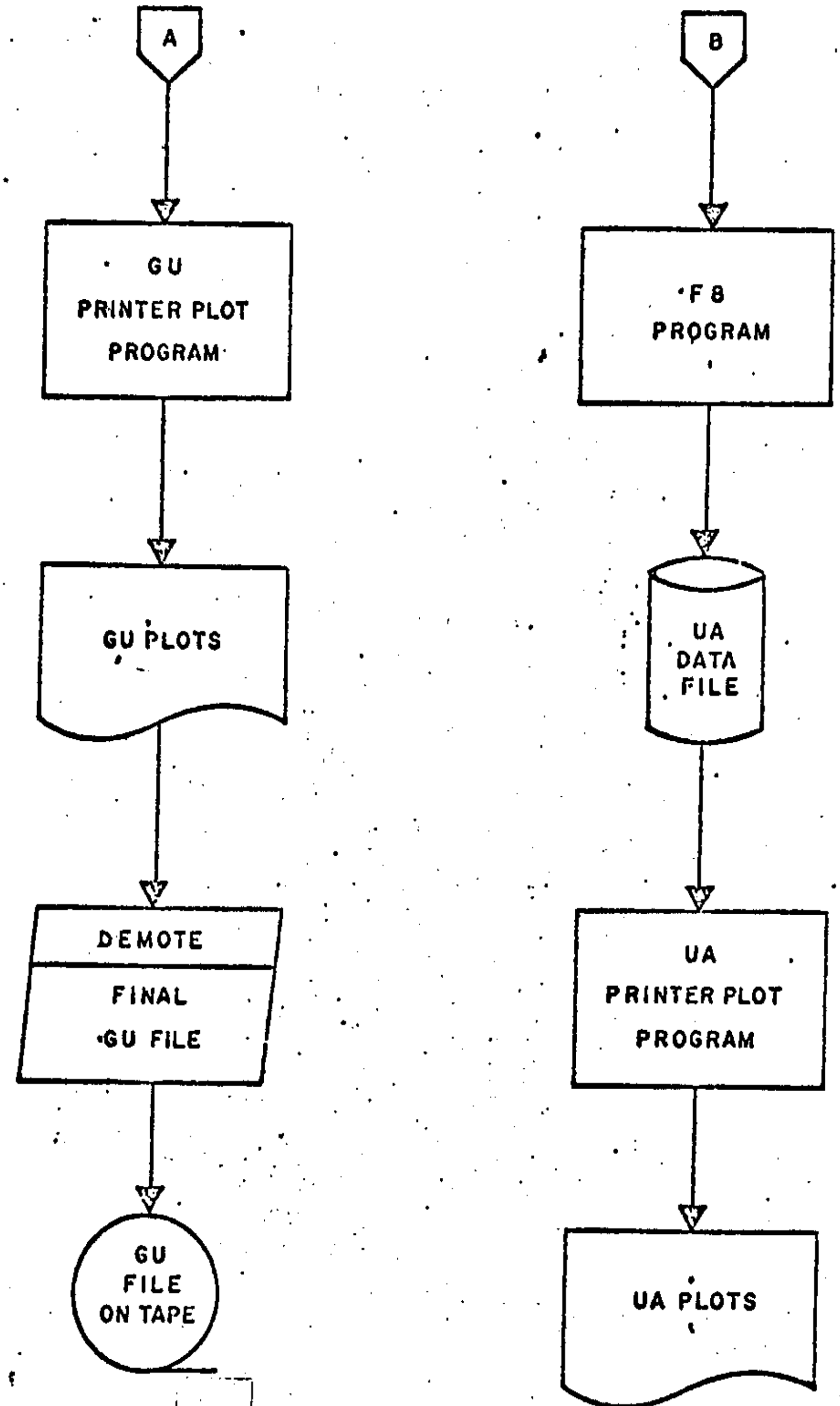

Figure 1. BIMS Data Processing System (2 of 2)

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NOTES FOR USERS OF UNIFIED ABSTRACT FILE DATA FROM THE ULTRAVIOLET NITRIC OXIDE (UVNO) EXPERIMENT ON ATMOSPHERE EXPLORER C (AE-C)

A. EXPERIMENT RATIONALE

The purpose of the UVNO experiment is to measure the distribution of, and variations in, nitric oxide molecules in the altitude range 100-250 km. Nitric oxide is produced in this region by the reaction of $N(^4S)$ and $N(^2D)$ with O_2, and is removed by reaction with $N(^4S)$ or, less importantly, by diffusion. The atomic nitrogen is produced by the dissociation of N_2 following the absorption of EUV sunlight by the atmosphere. The distribution of NO depends on temperature (through the strong temperature dependence of the reaction between $N(^4S)$ and O_2), on composition (through the competition between the reaction between $N(^2D)$ and O_2 and the quenching of $N(^2D)$ by O), and on transport processes.

B. INSTRUMENT SUMMARY

The UVNO instrument is a fixed-grating Ebert-Fastie spectrometer which accepts light in a 15Å bandpass centered on the (1,0) Gamma band of NO at 2149Å. It measures sunlight which has been re-sonantly scattered in this band by ambient NO molecules. The detector is a photomultiplier with a sapphire window and a CsTe cathode; its output is fed into pulse-counting electronics. The line of sight is perpendicular to the S/C spin axis, which in turn is parallel to the orbit normal vector. The field of view is $4^{o} \times 1/4^{o}$, with the long axis parallel to the S/C spin axis and therefore parallel to the viewed limb. On despun orbits the instrument looks perpendicular to the line joining the center of the earth and the S/C, in the wake direction. On spinning orbits, the instrument scans the limb of the Earth once per spin. Its sampling time is 21 msec, giving an angular smearing (at 4 rpm) of $1/2^{o}$.

C. DATA WORDS

UVNO entries in the AE-C Unified Abstract File consist of 5 words per 15 sec:

#67 - H_{SC} The NO scale height at the S/C altitude (km)

#68 - NO_{SC} The NO density at the S/C altitude (cm^{-3})

#69 - NO_{150} The NO density at 150 km (cm^{-3})

#70 - NO_M The maximum NO density observed during a given limb scan (cm^{-3})

#71 - Z_M The altitude at which this maximum occurs (km)

See Section I for more details.

D. DATA CATALOG

Attached is a catalog of those February 1974 orbits for which UVNO data is available. On most orbits measurements exist for S/C altitudes less than about 250 km. On spinning orbits, measurements of NO at 150 km may exist at S/C altitudes up to 350 km,

E. CALIBRATION

The instrument was calibrated before launch in the Laboratory. A diffusing screen was illuminated by light from a Xenon lamp which had been passed through a monochromator. The screen was then measured by the instrument and by a field-limited standard phototube. In this way the sensitivity to an extended source was measured as a function of wavelength. In flight, the detector sensitivity was periodically monitored using an internal lamp. No direct monitoring of the reflectivity of the optics was performed, but no systematic changes in the signal levels produced by viewing the Rayleigh scattering atmosphere were observed during the period between launch (in December 1973) and February 1974.

F. RELIABILITY OF DATA

1. Despun orbits. On despun orbits, the accuracy of UVNO results depends on the success of the background subtraction technique (see Section I), but more importantly on the accuracy of the S/C attitude information. On an unknown number of orbits, the instrument pointing was subject to $\sim 2\ 1/2^{\circ}$ error (due to an ambiguity in the S/C ACS system); on these orbits, the "true" NO density would be ∿60% larger than those entered in the UAF. A list of orbits on which this problem was known to occur is attached. (The UAF entries have not been adjusted).

2. Spinning orbits. No attitude errors exist because the UVNO detection of the limbs of the earth provided pointing

information to a very high accuracy. However, the curve-fitting algorithm used to analyze spinning-orbit data (see Section 1) strongly weights the low-altitude, strong-signal region at the expense of the spacecraft-altitude, weak-signal region; so the reported NO density at S/C altitude, and the NO scale height (words 68 and 67) are not reliable.

G. EVENTS AFFECTING DATA

Except as noted in (F) above, the UVNO entries in the UAF have already been screened for spurious or misleading results.

H. ANOMALIES IN DATA

See (G) above.

I. DATA REDUCTION

1. Noise removal. The cosmic-ray and energetic particle environment of the experiment in space produced obvious spikes in about 20% of the samples. These were removed by rejecting samples lying above a 2σ limit calculated from 5 neighboring samples. The remainder of the spurious counts were assumed to be random, and were removed (along with the genuine "dark counts") by background subtraction techniques.

2. Temperature and optical thickness correction

The response of the instrument to a slant column containing N mols/cm^2 at some temperature T is

$$C = \int_0^N (Sg)\ dN \qquad \text{counts/21msec}$$

where g is the number of solar photons scattered per molecule per second, and S is the instrument sensitivity. A theoretical study of the scattering and detection processes, using the measured instrument slit-function, was performed. The results can be approximated by

$$(Sg) = P/(Q+N) \qquad \text{where } P = 10(70 + T)$$
$$Q = P{*}5.7(12)(1+T^2/3.8(6))$$

Thus $C = P \ln (1+N/Q)$

or, rearranging, $N = Q\left[\exp(C/P)-1\right]$ (1)

3. Despun orbits. For despun orbits, the data was averaged in 15 second periods after noise removal. The background count level was obtained from measurements at high altitudes on downleg and upleg, and subtracted; the remaining NO signal was rejected if it was less than half the subtracted background. NO was assumed to be distributed according to

$$NO(Z) = NO_{SC} \cdot \exp\left\{-(Z-Z_{SC})/H_{SC}\right\}$$

where H_{SC} was chosen to be 33 km (representative of actual values). Then

$$N = NO_{SC} \cdot H_{SC} \cdot Ch(R_E + Z_{SC}, H, \theta) \qquad (2)$$

in which $Ch(R,H,\theta)$ is the Chapman function and θ (the look angle measured from the zenith) is obtained from S/C attitude data. NO_{SC}

is then obtained from (1) and (2). T was obtained from the formula

$$T = 900-550.\exp\left\{-\frac{Z_{SC}-120}{50}\right\} \tag{3}$$

The error introduced by assuming this value of T rather than a measured value is small compared to other uncertainties. The parameters NO_{150}, NO_M and Z_M were not obtained on despun orbits.

4. Spinning orbits. On spinning orbits the background count level was measured over a 30^o arc near the zenith, and subtracted. At altitudes below Z_{SC}, NO was assumed to form a layer given by

$$\begin{aligned} NO(Z) &= 2NO_M\left[\exp\left(-\frac{Z-Z_M}{H_{SC}}\right) - \exp\left(-2\frac{Z-Z_M}{H_{SC}}\right)/2\right] \\ &= 2NO_M\ (bx - b^2x^2/2) \end{aligned} \tag{4}$$

in which: NO_M, H_{SC}, and Z_M are to be determined;

$x = \exp\ (-(Z-Z_o)/H_{SC})$ where $Z_o = 90$ km

$b = \exp\ ((Z_M-Z_o)/H) = X_M^{-1}$.

The observed slant column density is then

$$N(Z_L) = 2NO_M \cdot \sqrt{2\pi RH}. \quad (bx - b^2x^2/2\sqrt{2}) \tag{5}$$

where Z_L is now the look altitude (the lowest altitude reached by the instrument line-of-sight). From (1) and (5) we have

$$e^{C/P} = 1 + 1/Q \cdot 2NO_M \sqrt{2\pi RH}(bx - b^2x^2/2\sqrt{2}) \tag{6}$$

The instrument counts C at each look altitude Z_L sampled during the limb-scan were fitted to the expression

$$e^{C/P} = 1 + Ax - Bx^2$$

by a least squares process in which H_{SC} was varied. Then the parameters NO_M and Z_M were readily obtained from A and B, using (6). The exponential expression (3) for T was used (with Z_{SC} replaced by Z_L) above 120 km, and replaced by

$$T = 175 + 175\ ((Z_L - 85)/35)^2$$

for values of Z_L less than 120 km. The actual curve-fitting process was more complex than implied above. It assumed that NO = 0 wherever expression (4) is negative, and it also included an iterative correction for Rayleigh scattering contamination of the signal below 100 km. The parameters NO_{SC} and NO_{150} were obtained from expression (4) using the derived values of NO_M, H_{SC}, and Z_M.

At altitudes so high (>200 km) that the above fitting process failed due to poor altitude resolution, it was still possible to find NO_{150} by assuming an exponential distribution of NO and analyzing only the data for which Z_L lay between 120 and 180 km. This procedure generally failed above about 350 km.

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UVNO AE-C UAF CATALOG FOR FEBRUARY 1974

500	0	1	2	3	4	5	6	7	8	9
10										
20					D			D	S	
30	S	S		S						
40								D		
50		S				S		S		S
60		D		D				D		D
70		D		S	S	S	S	S	S	S
80	S	S	S	D#			D#		D#	D
90					D#	S	S	S	S	S
600	S	S		S	S	D#	D#	D		D
10	D					S			S	S
20	S	S	S	S	S	S	S	D#	D	
30	D	D#	D#	D#			D	S		
40	S	S	S	S	S	S	S		S	
50	D#			D#	D#	D	D#	D#		
60	S			S	S	S	S	S		S
70	S	D#								
80		S			S	S	S	S		S
90		S								D#
700			D	S			S	S	S	S
10				S						
20						S			S	S
30										
40										
50										
60										
70										
80										
90			S			S		S	S	
800	S		S							
10								S	S	S
20	S		S		S					

Notes:

1) Entries in the table indicate orbits for which UVNO results exist; for example, the firstorbit is number 524. D indicates a despun orbit, and S indicates a spinning orbit.

2) Near orbit 760, the sun crossed the plane viewed by the instrument. To prevent damage, UVNO was turned off if the sun was within 5° (on spinning orbits) or 10° (on despun orbits) of this plane.

3) The S/C attitude data is known to be in error on orbits marked with a #. On these orbits, the values of NO_{sc} should be increased by about 60%.

This documentation of the Visible Airglow Experiments (VAE's) on Atmosphere Explorer-C, -D and -E, (AE-C, -D, -E) is divided into 3 parts. Part 1 contains an explanation of the VAE's capability and utility as an airglow measuring instrument, the quantities measured, the modes employed and the instrument sensitivities and background contamination problems.

Part 2 is a discussion of scientific results which included VAE data as the principal data set in the analysis. An up-to-date bibliography of papers, published or in press, in which VAE data has been analysed is also included.

Part 3 contains a complete description of the handling and storage of VAE data in the unified abstract files, the assumptions used in the data reduction and the algorithums used in converting raw data to geophysical units.

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NATIONAL SPACE SCIENCE DATA CENTER DOCUMENTATION

AE-

73-101A-14A C

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THE VISIBLE AIRGLOW EXPERIMENT ON

ATMOSPHERE EXPLORER-C, -D, and -E

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I. VAE Capability and Sensitivity

The Visible Airglow Experiment (VAE) on Atmosphere Explorers C, -D and -E (AE-C, -D, -E) is an airglow photometer designed to measure various thermospheric emission features during the day and night both at low latitudes and in auroras. The photometer has two distinct optical channels, a high sensitivity channel (channel 2) with a large field of view (3° half angle cone) and a low sensitivity channel (channel 1) with a narrow field of view (3/4° half angle cone) to resolve small airglow features. The system is protected by a combination 100 to 1 attenuating system and a cathod back biasing scheme which allows measurements of maximum sensitivity within a fraction of a second of viewing the bright limb of the earth.

The experimental design allows six atmospheric emissions from the near ultraviolet to the near infrared to be monitored regularly on each satellite. The six filters are mounted on a wheel along with a dark position and calibrate position. The calibration source is made of phospher and is activated by radioactive promethium. Each optical system employs a combination of a simple objective lens and field stop to define the angular field of view. The integration periods for channels 1 and 2 are 32 and 120 msec, respectively. A summary of the emission wavelengths and their atmospheric sources measured on each satellite follows:

<u>VAE-C</u>

1. OI($^3P-^1D$) emission at 6300Å
2. OI($^1D-^1S$) emission at 5577Å
3. OII($^2D-^2P$) emission at 7319-30Å

4. $NI(^4S-^2D)$ emission at 5200Å

5. $N_2I(B^3\Pi_g, v=0 - C^3\Pi_u, v=0)$ emission band at 3371Å

6. $N_2II(X^2\Sigma_g^+ v=1 - B^2\Sigma_u^+, v=0)$ emission band at 4278Å

VAE-D

1. $OI(^3P-^1D)$ emission at 6300Å
2. $OI(^1D-^1S)$ emission at 5577Å
3. $OII(^2D-^2P)$ emission at 7319-30Å
4. $NI(^4S-^2D)$ emission at 5200Å
5. $N_2II(X^2\Sigma_g^+, v=1 - B^2\Sigma_u^+, v=0)$ emission band at 4278Å
6. $HI(n=2-4)$ emission at 4861Å

VAE-E

1. $OI(^3P-^1D)$ emission at 6300Å
2. $OI(^1D-^1S)$ emission at 5577Å
3. $OII(^2D-^2P)$ emission at 7319-30Å
4. $NI(^4S-^2D)$ emission at 5200Å
5. $MgII(^2S-^2P)$ emission at 2802Å
6. $HI(n=2-3)$ emission at 6563Å

VAE may be operated in any of the following modes for geophysical data gathering. They are defined in terms of the filter wheel operation:

A. Fixed wheel: Any one of eight possible filter positions. At each position a pair of atmospheric emissions is measured. One place is reserved for calibration and one for dark count information.

B. Filter cycling: The filter wheel may be cycled from one position to the next at the following rates:

1) once per nadir

2) once per 2 nadir

3) once per 4 seconds

4) once per 8 seconds

5) once per 16 seconds

6) once per 32 seconds

Modes 1 and 2 under B are used exclusively when the spacecraft is spinning.

VAE is mounted on the spacecraft with the narrow field of view channel viewing in the -X direction and the wide field of view channel viewing in the +Y direction. For an oriented spacecraft, Ch 1 views nearly horizontally in the opposite direction to the spacecraft motion. Ch 2 views vertically upward for a spacecraft oriented normally and views in the downward direction for an inverted spacecraft. In the spinning mode both channels, in one spin period, view up and down and in addition perform limb scanning experiments on each horizon.

The utility of the VAE for measuring airglow emissions depends upon its sensitivity in Rayleighs/count and on the ability to determine background emissions (e.g. galactic emissions) and dark count. Appendix 1 is a tabulation of sensitivities for the 3 experiments for various temperatures. To accomplish the latter, a period of several seconds is used at the beginning of a data taking sequence to measure the dark count of each tube by inserting the dark filter wheel position in place. This procedure is again repeated just before turnoff. A very accurate determination of dark count can then be made by averaging a large number of integration periods during these sequences. Appendix 2 gives dark counts/IP for each instrument as a function of temperature.

The galactic emission contaminates all data taken when viewing above the solid earth. However, it is only important when viewing emissions of intensity less than 50 Rayleighs. A careful determination of the galactic background emission, however, can be rewarding as volume emission rates ~~if~~ of 0.1 ph cm^{-3} sec^{-1} can be deduced with 30% statistical accuracy.

II. Scientific Results from the Visible Airglow Experiments

Information obtained by the Visible Airglow Experiments on AE-C, -D, and -E has led to an increased understanding of the photochemistry of metastable constituents in the thermosphere. The combination of airglow data with simultaneous composition measurements has quantified numerous rate coefficients and, in some cases, has pointed to the existence of sources for metastable species which were unknown prior to the AE program. In addition, these studies have demonstrated the utility of data taken by satellite platforms in deducing reaction rates for use in atmospheric calculations. Such experimental configurations are free from some of the problems encountered in the laboratory.

Studies by the VAE group have produced the following results pertinent to the photochemistry of the thermosphere. Analysis of the 6300Å red line emission from the ^1D term of atomic oxygen has produced a quenching rate for $O(^1D)$ by N_2 which is considerably smaller than early laboratory results, but which is reasonably consistent with more recent work (Hays et al., 1977). The magnitude of the green line feature from $O(^1S)$ at 5577Å as measured by VAE required a new source in addition to those used in previous work (Frederick et al.,1976). Studies carried out prior to AE did not have simultaneous sets of composition data to use in conjunction with the airglow. The necessity to use model atmospheres introduced large uncertainties and masked the presence of the additional source. The magnitude and twilight variation of the emission indicated that the reaction $N + O_2^+ \rightarrow NO^+ + O(^1S)$ was operative (Frederick et al., 1977). The 7319-7330Å volume emission rate profile discussed by Walker et al.(1975) and Rusch et al.,(1977) indicated that both N_2 and O were effective in quenching the metastable ion $O^+(^2P)$. The 5200Å emission from the metastable nitrogen atom, $N(^2D)$, is sufficiently bright that it must be produced at near unit efficiency in the F-region. Frederick and Rusch (1977) derived values for rate coefficients which control $N(^2D)$ loss. The loss rate due to reaction with O_2 is in good agreement with laboratory results, however, the deduced rate coefficient for $N(^2D)$ quenching by atomic oxygen is much smaller than the current value from the laboratory. Calculations based on $N(^2D)$ loss rates similar to those discussed above by Rusch et al.,(1975) indicate that the $N(^4S)$ concentrations in the altitude range 200–250 km are of order 10^7 cm^{-3}, much larger than the NO concentration. The 3371Å emission from the $C^3\pi$ term of N_2 is excited exclusively by photoelectrons and the downward transition is radiatively allowed. Analysis of several orbits by Kopp et al., (1977) showed that the magnitude of the 3371Å emission rate increases as the ratio of atomic oxygen to molecular nitrogen decreases. This is interpreted as being due to the competition between O and N_2 as sinks of photoelectron energy.

The remote sensing capabilities of the VAE instrument allow monitoring of airglow features which originate at altitudes well below that of the satellite. Wasser et al. (1976) employed green line, 5577Å,data obtained in a slow spinning mode to conclude that the Chapman mechanism, $O + O + O \rightarrow O_2 + O(^1S)$, is a more likely mechanism for exciting $O(^1S)$ than the two step process, $O + O + M \rightarrow O_2{}^* + M$ followed by $O_2{}^* + O \rightarrow O_2 + O(^1S)$, in the altitude range 90 to 110 km.

Airglow emissions from high latitudes provide a powerful tool for studying phenomena associated with electrodynamic processes and particle precipitation. Comparison of the 4278Å surface brightness from $N_2{}^+(B^2\Sigma)$

with the electron flux measured simultaneously in the aurora confirmed the constancy of their ratio (Kasting and Hays, 1977). This provides an effective means of estimating particle energy deposition by monitoring auroral emissions. Data taken near the base of the dayside polar cusp region of the magnetosphere show a close correlation between particle influx, changes in atmospheric neutral composition, and airglow enhancements (Frederick, 1977). The polar cusp appears as a column of enhanced airglow near 75 to 76 degrees magnetic latitude with peak emission originating near 260 km in altitude. Analysis of auroral observations from VAE by Hays and Anger (1976) has led to the development of new techniques for removing surface and cloud albedo effects from satellite data.

III. VAE UA HEADER RECORDS

For each orbit VAE stores two header records in addition to the data records. The first header is a nine word record giving orbit number and experimental status. Word 6 of this record is an integer and the other 8 words are character words. The 6th word contains the orbit number and the 9th word contains the mode of the VAE instrument. If this word contains 'DUAL' the VAE instrument changes mode in this pass. The second header record will define both modes. The other seven words are fixed character information which is added for clarity. Modes are related to wavelengths observed as tabulated in the Appendix. A typical 9 word header as follows:

```
VAE UA DATA: ORBIT=   ; 400 MODE=  6EF6
```

The second header is a more complete description of the VAE data. It is a 180 word record. Words 1 through 80 describe the data stored if the mode of the instrument does not change and describe the data from the initial mode if the instrument alters mode in a pass. In the latter case words ~~1~~ 81 (?) through 160 will describe the second mode. In both cases words 161 through 180 contain blanks. If there is only one mode words 81 through 160 will contain blanks.

The second header words are all character except words 9, 12, 15 and 18 which are integer words. If a second mode exists words 82, 92, 95 and 98 are integers.

Most of the second header record is fixed characters included for clarity. The words that vary with orbit will be discussed.

Word 9 and word 82, if used, contain orbit number.

Word 12 and word 92, if used contain the date of the data in the form yyDDD where yy = year, e.g., 74 = 1974 and DDD = day where Jan 1 = 001.

Word 15 contains the initial time of the data in milliseconds, GMT. This points to the first data record for this mode that does not contain all zeroes (no data written) or all -9999s (fill data). If word 95 is used it contains the initial time of the data for the second mode.

Word 18 contains the final time of the mode, i.e. the time of the last record that contains non-fill data. If word 98 is used it contains the final time of the data for the second mode.

The 24th word (and 104th word, if used) contain the mode as characters.

The 24 words beginning at word 25 (and word 105 if used) give information about the six data values stored at each 15 second interval. Four consecutive words in character format are used for each data value. The first two words in each set (e.g. words 25-26, 29-30,—) point to which variable of the data record the following two words describe. They will contain the characters 'COL. i _' where i = 1,2,......6 is the data word being described. The third word of the set (e.g. words 27, 31, ---) will contain the characters 'CH1' or 'CH2'. CH1 implies that the corresponding data word was observed on channel 1, the narrow field of view channel and CH2 implies that the corresponding data word was observed on channel 2 with the wide field of view. The fourth word (e.g. words 28, 32.....) will contain the direction in which the channel was looking when the data was collected. 'UP' means looking outward from the earth, 'DOWN' means looking towards the earth, 'FURW' means looking in the direction of satellite motion and 'BACK' means looking backward along the satellite track. If the 3rd & 4th words of the set contain 'NO DATA' the corresponding data word will always contain fill data.

For example COL. 3 - CH1 BACK means that the third word in a data record will contain data from channel 1 looking backwards.

If the mode of the instrument is such that the filter wheel is stepping through all wavelengths (S4S, S8S) only data from channel 2 is stored and the 24 words discussed above will indicate which data word corresponds to which wavelength. In addition words 71 through 80 (or words 151 through 160 if the second mode of a dual turn on is stepping) will indicate direction of observation. If the filter wheel is not stepping these words are blank.
A typical header follows.

```
VAE UA DATA DESCRIPT  :

VAE UA FILE DESCRIPTION:
CR??T?=   400; DATE= 75?56; TINIT= 37920000; TEND=  35315000
:   INITIAL  MODE=  65F6
COL.1 - CH1  UP
COL.2 - CH1 DOWN
COL.3 - CH1 BACK
COL.4 - CH1 FORW
COL.5 - CH2  UP
COL.6 - CH2 DOWN
ALL VALUES ARE REAL TYPE IN UNITS OF RAYLEIGHS.
A VALUE OF -9595 INDICATES NO DATA.
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DATA RECORDS

VAE's data is in units of RAYLEIGHS.

For oriented orbits, Channel 1 is always looking back and channel 2 is looking either up or down (the direction of ch 2 is constant over an orbit).

Channel 1:

$$\text{RAYLEIGHS} = \frac{\sum_{i=1}^{N} (\text{CNT}_i - \text{BACKGRND}_i)}{N} \text{*SENS}$$

Channel 2:

$$\text{RAYLEIGHS} = \frac{\sum_{i=1}^{N} (\text{CNT}_i - \text{BACKGRND}_i) * |\cos(\text{ZN}_i)|}{N} \text{*SENS}$$

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where

CNT_i= VAE photometer count as picked up from the telemetered data.

$BACKGRND_i$= Dark count of instrument at time count i is taken. Computed from instrument temperature.

SENS= sensitivity of instrument in RAYLEIGHS per count.

ZN_i= Zenith angle CH2 makes with the local vertical when count i is taken

N= 32 for CH2, fixed filter wheel. This corresponds to 4 seconds

= 125 for CH1, fixed filter wheel. This corresponds to 4 seconds

N = 8 for CH2, MODE=S4S, corresponding to 1 second.

32 for CH1, MODE=S4S, corresponding to 1 second.

N= 16 for CH2, MODE=S8S, corresponding to 2 second.

64 for CH1, MODE= S8S, corresponding to 2 second.

United Abstract data values are obtained every 15 seconds by linearly interpolating data taken as defined above or either side of the 15 second point.

For spinning orbits both CH1 and CH2 are spinning about the satellite axis. VAE stores data taken from all four directions on CH1 and from up and down only on Ch2.

UP and DOWN data for CH1 and CH2 is obtained as follows. Above 200 km UP data is collected and averaged over a window centered about the vertical and extending 45° on either side of it as the VAE instrument is looking away from the earth. DOWN data is collected and averaged in the same manner as the satellite is looking towards the earth. Below 200 km the perigee effects begins to contaminate the data. An attempt is made to remove from the averaging process the data counts looking between 20° backwards to 45° backwards in both the up and the down averaging.

In all cases:

$$\text{RAYLEIGHS} = \frac{\sum_{i=1}^{N} (\text{CNT}_i - \text{BACKGRND}_i) * |\cos(\text{ZN}_i)|}{N} * \text{SENS}$$

where CNT_i, BACKGRND_i, ZN_i, SENS are defined as for oriented data and N is the number of counts collected within the up or down window.

The forward and backward looking data from channel 1 for spinning orbits is calculated differently. Data is collected in a window centered about 90° or 270° and extending 20° on either side (i.e., 70° to 110° or 250° to 290°) in the form counts NS zenith angle. This defines a function COUNT (ZN) in the domain (70°, 110°) or (250°, 290°). This function is smoothed, then the smoothed data is used to fit the second order expansion about 90° or 270°, e.g.,

$$\text{COUNT (ZN)} = \text{COUNT}(\pi/2) + \frac{d\ \text{COUNT}}{d\text{ZN}}\bigg|_{\pi/2} (\text{ZN} - \pi/2)$$

$$+ 1/2\ \frac{d^2\text{COUNT}}{d^2\text{ZN}}\bigg|_{\pi/2} (\text{ZN} - \pi/2)^2$$

RAYLEIGHS at $\pi/2$ is taken to be

$$\text{COUNT}\ (\pi/2)\ {*}\text{SENS}$$

No attempt is made to correct for perigee effect so data below 200 km is suspect in the forward direction.

United Abstract data values for spinning orbits are obtained every 15 seconds by linearly interpolating data taken as discussed above on either side of the 15 second point.

APPENDIX

Wavelength in angstroms observed on channels 1 and 2 tabulated as a function of instrument mode (fixed filter wheel)

VAE-C

Mode	Wavelength on channel 1	Wavelength on channel 2
55F6	5577	6300
73FD	7319	NO DATA
33F5	3371	5577
52F7	5200	7319
42F3	4278	3371
CLF5	NO DATA	5200
63F4	6300	4278

VAE-D

Mode	Wavelength on channel 1	Wavelength on channel 2
73F4	7319	4861
52FD	5200	NO DATA
55F7	5577	7319
42F5	4278	5200
63F5	6300	5577
CLF4	NO DATA	4278
48F6	4861	6300

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VAE-E

Mode	Wavelength on channel 1	Wavelength on channel 2
73F6	7319	6563
52FD	5200	NO DATA
55F7	5577	7319
28F5	2800	5200
63F5	6300	5577
CLF2	NO DATA	2800
65F6	6563	6300

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Appendix 1

VAE Sensitivity

The sensitivity of the VAE-C, -D, -E instruments are given in Rayleighs/count for each channel as a function of temperature.

VAE-C

Channel 1

T(°C)	WAVELENGTH (A°)					
	3371	4278	5200	5577	6300	7319
-20	35.2	10.7	12.2	20.0	23.6	101.5
-10	35.3	10.4	11.5	19.6	20.7	79.3
0	35.8	10.6	11.1	19.4	19.2	66.8
10	36.7	10.9	11.0	19.4	18.6	57.3
20	37.9	11.4	11.1	19.9	18.4	51.1
30	39.4	12.1	12.0	21.8	18.6	45.9
40	41.4	12.8	13.5	24.4	19.6	44.2

Channel 2

-20	0.61	0.15	0.15	0.24	0.30	1.45
-10	0.61	0.15	0.14	0.24	0.27	1.13
0	0.62	0.15	0.14	0.23	0.25	0.95
10	0.64	0.16	0.14	0.23	0.24	0.82
20	0.66	0.17	0.14	0.24	0.24	0.73
30	0.68	0.17	0.15	0.26	0.24	0.65
40	0.72	0.19	0.17	0.29	0.25	0.63

VAE-D

Channel 1

T_x (°C)	WAVELENGTH (A°) 4278	4861	5200	5577	6300	7319
-20	26.0	9.7	7.6	12.2	22.2	80.0
-10	24.2	8.5	7.6	11.3	17.6	72.1
0	23.3	8.2	7.9	11.1	16.7	68.5
10	23.5	8.1	8.4	11.1	16.3	72.1
20	24.4	8.1	9.6	11.1	16.4	77.8
30	26.2	8.1	12.2	11.2	19.7	87.3
40	29.2	8.3	16.3	11.6	20.4	106.6

Channel 2

T_x (°C)	4278	4861	5200	5577	6300	7319
-20	0.37	0.13	0.10	0.14	0.24	0.76
-10	0.34	0.12	0.10	0.13	0.19	0.69
0	0.33	0.11	0.10	0.13	0.18	0.65
10	0.33	0.11	0.11	0.13	0.18	0.69
20	0.34	0.11	0.12	0.13	0.18	0.74
30	0.37	0.11	0.16	0.13	0.21	0.83
40	0.41	0.11	0.21	0.13	0.22	1.02

Appendix 2

Dark count/I.P. vs. Temperature

	VAE-C		VAE-D		VAE-E	
T(°C)	ch 1	ch 2	ch 1	ch 2	ch 1	ch 2
-20	0.02	0.01	0.00	0.00	0.00	0.04
-10	0.11	0.08	0.01	0.03	0.03	0.24
0	0.50	0.45	0.04	0.14	0.13	1.38
10	2.34	2.57	0.22	0.73	0.78	8.01
20	10.95	14.81	1.16	3.92	4.40	46.50
30	51.27	85.20	6.17	20.98	25.49	269.99
40	240.13	450.29	32.41	112.25	147.70	-

VAE-E

Channel 1

T(°C)	WAVELENGTH (A°)					
	2800	5200	5577	6300	6563	7319
-20	2.1	11.0	12.7	19.8	22.8	124.4
-10	2.1	10.3	12.7	19.6	21.2	88.8
0	2.0	10.1	13.2	20.4	20.4	73.7
10	2.0	10.1	15.8	22.5	20.7	61.7
20	2.0	10.4	21.8	24.2	21.3	53.9
30	2.0	11.7	29.3	46.2	22.8	47.2
40	1.9	14.1	42.4	72.8	29.3	44.2

Channel 2

-20	0.03	0.15	0.16	0.23	0.26	1.27
-10	0.03	0.14	0.16	0.23	0.24	0.91
0	0.03	0.14	0.16	0.24	0.23	0.76
10	0.03	0.14	0.19	0.26	0.23	0.63
20	0.03	0.14	0.27	0.29	0.24	0.55
30	0.03	0.16	0.36	0.54	0.26	0.48
40	0.03	0.19	0.52	0.86	0.33	0.28

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AE MESA DESCRIPTION FOR NSSDC

A. OBJECTIVE

The scientific objective of the AE Miniature Electrostatic Accelerometer (MESA) is to study variations in the neutral atmospheric density and to relate this data to solar and geophysical phenomena. This experiment provides density data which are valuable for understanding the structure and dynamics of the lower thermosphere and for development of atmospheric models.

B. EXPERIMENT DESCRIPTION

The instrument is used to measure the satellite decelerations induced by aerodynamic drag which is directly proportional to atmospheric density. The instrument sensing element consists of a proof mass which is electrostatically suspended and force rebalanced. Drag accelerations cause motion of the proof mass from its null position. This motion is detected electronically and accurately controlled voltages are generated on "forcer" electrodes to exactly balance the drag accelerations. Three instruments with mutually orthogonal sensitive axes were flown on each satellite. The instruments are mounted internal to the spacecraft. The sample time of each instrument was 0.25 seconds. A complete description of the instrument is given in reference 1.

C. CALIBRATION PROCEDURES

Scale factor ground calibration data are obtained by input of an accurately known component of earth's gravitational field into the instrument sensitive axis. Laser interferometer techniques are used to accurately measure the angle between the sensitive axis and the gravitational field. Absolute calibration of scale factor is estimated to be accurate to better than $\pm$ 0.5%.

D. OVERALL DATA REDUCTION PROCEDURE

1. Filtering -- Drag accelerations are extracted from "noise" accelerations utilizing digital filtering techniques. The theory and application of the filtering procedures used for the AE MESA data are completely described in reference 2. For despun orbit data variations in atmospheric drag lower than about 0.067 Hz are passed through the filter while higher frequencies are filtered out. For spinning orbit data the effect of the filter is to eliminate accelerations with frequencies higher than 0.013 Hz.

2. Density Calculation -- Atmospheric density is calculated from measured drag accelerations on one sensor using the equation:

$$\rho = \frac{2 M a_D}{C_D A V^2 \cos\theta}$$

where ρ = atmospheric density, a_D = measured drag acceleration, θ is the angle between the instrument sensitive axis and spacecraft velocity vector and M, A, C_D, and V are respectively the satellite's mass, cross-sectional area, drag coefficient and velocity. For spinning orbit data only the positive and negative ram points were utilized to minimize uncertainties in the filtered output, cross-sectional area, and attitude. Because the density is proportional to the magnitude of the drag the data are more accurate at the lower altitudes. For spinning orbit data the errors are estimated as follows: uncertainty in area-to-mass ratio (A/M) is $\pm$ 1%; attitude uncertainty is negligible; the filtering error varies from negligible at perigee to $\pm$ 2% at 200 km and $\pm$ 5% at 250 km. For despun orbits there is an additional error of typically $\pm$ 2%. This is because the sensor is nominally at 45° to the velocity vector in this mode and attitude errors of about 2-3° are encountered. For both spinning and despun data there may be a $\pm$ 10% systematic error in the assumed free molecular flow drag coefficient of 2.2.

3. Final Data -- The density results placed into the Unified Abstract file were calculated at 15 second intervals from the complete geophysical unit files using a second order Lagrangian fit to the three data points closest to the appropriate time.

4. Thorough Data Analysis Procedures---Reference 3 completely describes the AE MESA data processing system.

E. ORBITAL PERFORMANCE OF SENSORS

All instruments on AE-C, -D, and -E appear to have performed normally throughout the missions. No anomalous behavior has been noted. All above comments refer to elliptical orbit data. The final processing for circular orbit data will be described in an appendix submitted at a later date.

F. OTHER CONDITIONS

The density data have been derived using spacecraft attitude results. Spuriously large attitude errors were obvious and these orbits have been deleted. If attitude errors of 5-10^{o} are used the accuracy of the density data will be decreased accordingly.

G. REFERENCES

1. Champion, K.S.W. and Marcos, F.A. (1973). The triaxial accelerometer system on Atmosphere Explorer. Radio Science, 8, 297.

2. Noonan, J.P., Fioretti,R.W. and Hass,B. (1975) Digital filtering applied to the Atmosphere Explorer-C MESA accelerometer data. AFCRL Rept. ACFRL-TR-75-0293.

3. Fioretti,R.W. (ed), (1976). Atmosphere Explorer MESA accelerometer processing system. AFGL Rept. AFGL-TR-76-0137.

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AE-C Retarding Potential Analyzer/Drift Meter - Data Submitted to NSSDC

The RPA/Drift Meter is a passive instrument mounted on a large ground plane such that its look direction corresponds to the +X direction of the space craft coordinates. The spacecraft +X axis points nominally along the spacecraft velocity vector in a circular orbit. For an elliptical orbit this condition is true only at perigee and apogee. The orientation of the spacecraft axes with respect to the earth is supplied with the AE data base.

The RPA/Drift Meter consists essentially of two sensors— one, the RPA, which measures the energy distribution of the thermal ions entering the sensor and another, the Drift Meter, which measures the angle of arrival of the ions relative to the sensor. A description of the instrumentation and detailed descriptions of the procedures used to determine the geophysical parameters may be found in Hanson et al. (1973) and Hanson and Heelis (1975).

The RPA consists of a circular entrance aperture to a gridded region which is terminated by a solid gold collector. One of the grids has a positive retarding potential applied to it which determines the energy of the ions that reach the collector. The retarding potential is swept from +32 (or +22) volts to 0 volts in 0.75 seconds and the resulting collector current versus retarding potential curve is fit to a theoretical expression using a least squares technique. The geophysical parameters obtained from this procedure appear in the UA file as

the ion temperature = T_i °K

the total ion concentration = N_i ions cm^{-3}

the ion drift velocity along the $\underline{+}X$ axis of the spacecraft = V_x $m\ s^{-1}$

the vehicle (ground plane) potential = ψ volts

In addition, the RPA can be operated in a "duct" mode where variations in the total ion current at zero retarding potential are monitored for three-second periods with a sensitivity that automatically adjusts to the magnitude of the variations. The geophysical parameter obtained from this operation and placed in the UA file is:

total ion concentration roughness $\frac{\Delta N_i}{N_i} = \sigma$ %

The ion Drift Meter consists of a square entrance aperture to a gridded field free region which is terminated by a segmented gold collector. The angles of arrival of the ions with respect to the $\pm$Y and $\pm$Z axes of the spacecraft are determined by measuring the asymmetry in the ion current between different collector segments. There is a direct relationship between the ion drift velocities along the $\pm$Y and $\pm$Z axes, the tangents of the angles of arrival with respect to these axes and the total ion velocity with respect to the sensor along the $\pm$X axis.

It is assumed that the ambient ion drift velocity along the $\pm$X axis of the spacecraft is zero so that the total ion velocity in this direction is equal to the spacecraft velocity in this direction. The contributions of the corotation velocity are removed from all the ion velocity components and the geophysical parameters obtained from this operation and placed in the UA file are

The ion drift velocity along the $\pm$Y axis of the spacecraft $= V_y$ $m\ s^{-1}$

The ion drift velocity along the $\pm$Z axis of the spacecraft $= V_z$ $m\ s^{-1}$

Again it should be emphasized that V_x, the RPA derived ion drift velocity, is assumed to be zero for the computation of V_y and V_z.

In addition to measuring the asymmetries in the collector currents, on AE-D and AE-E the total ion current is also monitored to provide a measure of the variations in total ion concentration. This parameter is particularly useful when the spacecraft is spinning and σ from the RPA is unavailable. The parameter total ion concentration roughness $\frac{\Delta N_i}{N_i} = \sigma_d$ % is determined by the Drift Meter and placed in the UA file for AE-D and AE-E.

The three components of the ion drift velocity V_x, V_y and V_z are directed along the $\pm$ X, $\pm$ Y and $\pm$ Z axes of the spacecraft. Spacecraft turnarounds change the directions of the $\pm$Y and $\pm$Z axes but leave the X axis direction unchanged. There is a sign convention attached to the drift velocities V_x, V_y and V_z as they appear in the UA file, which makes their directions and signs independent of the changing axes' directions.

1. Positive $\underset{\sim}{V}_x$ is directed along the X axis in the negative x direction.
2. Positive $\underset{\sim}{V}_y$ is directed along the Y axis away from the earth.
3. Positive $\underset{\sim}{V}_z$ is directed along the Z axis in the direction $-\underset{\sim}{V}_x \times \underset{\sim}{V}_y$.

Averaging & Filtering

The UA data presented here have undergone substantial averaging and filtering. The RPA and Duct data T_i, N_i, V_x, ψ and σ are obtained every 15 seconds from 30 second running weighted averages of the individual data points. The drift meter data V_y, V_z and σ_d are represented by the individual data point nearest to the time indicated. In this case the time difference between the data point and the time indicated is usually less than 2/3 sec.

Consistency Checks

Both the RPA and Drift Meter data have undergone a number of checks to ensure that obviously erroneous data do not appear in the UA File. These checks cannot of course cover all possible cases, but we believe that any erroneous data appearing in the UA file will be immediately recognizable in the form of "flyers."

Both the RPA and the Drift Meter suffer a degradation of their data at very low altitudes owing to a phenomenon caused by neutral particle impact on the instrument collectors. While the data degradation on the drift meter is immediately recognizable and is simply a function of the ambient total ion concentration, this is not the case for the RPA. For the RPA data the phenomena is rather difficult to detect and even at large ambient ion concentrations the shape of the retarding potential versus collector current curve can be seriously compromised. The RPA data below 200 km altitude does not appear in the UA file when this phenomena is likely to affect the data quality.

Similar distortions of the retarding potential versus collector current curves result when the angle between the look direction of the sensor (i.e. the spacecraft X axis) and the spacecraft velocity vector exceeds about 20°.RPA data do not appear in the UA file when this angle exceeds 20°.

The drift meter data are seriously compromised by any phenomena other than ion drift that may deliver an asymmetric current to the collectors. The neutral particle impact experienced by the RPA at low altitudes is one such phenomena. Drift Meter data below 200 km altitude is removed from the UA file when this phenomena is known to affect the data.

Photoemission from the grids and grid holders can also produce asymmetric currents when the sun shines into the sensor. Again the Drift Meter data are removed from the UA file when this condition is known to be serious.

Significant concentrations of light ions (H^+ and He^+) can affect the sensitivity of the drift meter. The data, which is calibrated correctly for O^+ and heavier ions, do not appear in the UA file when an adjustment for sensitivity change is known to be required.

Much of the data which does not appear in the UA file is retrievable with careful consideration of the ambient conditions existing at the time the data were taken. The user is encouraged to contact the investigator at The University of Texas at Dallas, from whom further extensive information can be obtained.

References

Hanson, W. B., D. R. Zuccaro, C. R. Lippincott, and S. Sanatani, The retarding potential analyzer on Atmosphere Explorer, Radio Sci., 8, 333, 1973

Hanson, W. B. and R. A. Heelis, Techniques for measuring bulk gas-motions from satellites, Spa. Sci. Instrum., 1, 493, 1975

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DATA CENTER DOCUMENTATION FOR THE

ATMOSPHERE EXPLORER CYLINDRICAL ELECTROSTATIC PROBE (CEP)

L. H. Brace, GSFC

Principle of Operation;

The Langmuir probe instruments for Atmosphere Explorers C, D and E have been described in detail in Brace et al, 1973. The technique employs two independent cylindrical collectors whose potentials are varied or held fixed as the resulting collected current is measured. The ion concentration, N_i is derived from the amplitude of the ion current collected when the collector is negative. The electron temperature, T_e is derived by computer fitting of the electron retardation current waveforms. Proper resolution of the volt-ampere curves is achieved by the use of an automatic ranging electrometer and an adaptive sweep voltage generator. These circuits continuously adjust the electrometer sensitivity and the applied voltage amplitude and starting potential to bring about "ideal" framing of each successive volt-ampere curve. By this we mean that the instrument adapts itself to the plasma it is encountering to resolve only that portion of the volt-ampere curve that is most useful for the measurement of N_i and T_e. In addition the satellite potential V_s is derived from each curve.

Resolution of the Measurements:

The one second sweep period determines the maximum spatial resolution of the measurement of T_e (approx. one value per 8 kilometers along the orbit). N_i is also obtained once per second. This resolution is actually attained only when the spacecraft is operating despun. In this mode, the collector never encounters the spacecraft wake and provides the full resolution of the measurements. When the spacecraft is spinning, the resolution is reduced to two measurements per spin (approx. 15 second spin period). The data in the UA file are listed at these 15 second intervals.

Accuracy of the Measurements:

The absolute accuracy depends upon the conditions, in particular, the spatial irregularity and the amount of plasma present. The nominal accuracy of T_e in a smoothly changing plasma with $N_i > 10^3$/cc is 5%. At lower densities, uncertainties in spacecraft shielding effects and microphonic noise signals increase the error in both T_e and N_i measurements. (The midrophonics originate primarily in the sensor itself as it responds to vibration input from the inertial wheel of the spacecraft). Comparison of the T_e measurements with coincident measurements by incoherent radar installations indicate agreement within 5%, Benson et al., 1977.

The error of the N_i values is less than 10% when O^+ or molecular ions are the dominant ion constituents, typically below 1000 kilometers. Where H^+ and He^+ are the major ions, a correction for their higher thermal velocity must be applied. At present, this correction is not well defined, and the error of N_i may be increased to 20% at these higher altitudes.

Format of the CEP Data

The results from CEP are stored in words 11, 12, and 13 of each UA Data record. Word 11 is the electron temperature, word 12 is the ion density, and word 13 is the satellite potential. The words are stored as floating point numbers.

References

Brace, L. H., R. F. Theis, A. Dalgarno, "The cylindrical electrostatic probes for Atmosphere Explorer C, D and E, Radio Science, 8, 341-348, 1973.

Benson, R. F., P. Bauer, L. H. Brace, H. C. Carlson, J. Hagen, W. B. Hanson, W. R. Hoegy, M. R. Torr, R. H. Wand, and V. B. Wickwar, "Electron and ion temperatures - A comparison of ground-based incoherent scatter and AE-C satellite measurements", J. Geophys. Res. 82, 36-42, 1977.

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AE-C Retarding Potential Analyzer/Drift Meter - Data Submitted to NSSDC

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PHOTOELECTRON SPECTROMETER

Dr. John P. Doering

The photoelectron spectrometers on AE-C measure electron energy spectra between 1 and 500 eV. The data written on the tape presented to the data center consist of 6 data points every 15 seconds giving the average electron flux observed in 6 energy intervals in units of $(cm^2\text{-eV-sr-sec})^{-1}$. The instrument has 2 sensors and 30 operating modes (described in full detail in the references listed at the end of this summary). In some of these modes only a partial sampling of the full 1-500 eV energy range is obtained, and consequently not all 6 words are written.

The normal energy ranges included in the 6 data words are as follows:

Word 1	2-3 eV
Word 2	7-9 eV
Word 3	12-17 eV
Word 4	25-30 eV
Word 5	37-40 eV
Word 6	100-500 eV

A portion of the data (acquired using the 1-500 eV, 4 times/sec, modes) has zero values in all but Word 4 and 6. In this case Word 4 contains the average flux from 7-42 eV and Word 6 contains the average flux in the 100-500 eV energy range. In all cases the data reported are a 15 sec average of the flux for the interval beginning with the time associated with the data word.

The data have been processed to remove the effects of direct entry of solar EUV radiation into the sensors, and attenuation of the low energy (~10 eV) signal by the spacecraft wake (see Doering et al. 1975). The data have not been corrected for the slight variations in spacecraft potential, a very slow degradation in the sensitivity of the electron multipliers used, for interception of part of the incident flux by the spacecraft, or for the effects of the penetrating radiation encountered in the radiation belts in the South Atlantic anomaly.

Energy time spectrograms (gray shade plots) of PES data for most of the orbits included here are on file at the PES Research Group

c/o J. P. Doering

Department of Chemistry

The Johns Hopkins University

Baltimore, Maryland 21218

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Doering, J. P., C. O. Bostrom, and J. C. Armstrong, The Photoelectron-spectrometer Experiment on Atmosphere Explorer, Radio Science 8, 387 (1973).

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Potemra, T. A., W. K. Peterson, J. P. Doering, C. O. Bostrom, R. W. McEntire, and R. A. Hoffman, Low Energy Particle Observations in the Quiet Dayside Cusp from AE-C and AE-D. Submitted to J. Geophys. Res.

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LOW ENERGY ELECTRON EXPERIMENT

ATMOSPHERE EXPLORER C AND D SPACECRAFT

Data Description

June 1977

R. A. Hoffman
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Code 625
Goddard Space Flight Center
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EXPERIMENT OVERVIEW

The Low Energy Electron (LEE) experiment[1] provides direct measurements of the energy input into the upper atmosphere due to electrons and ions in the energy range 0.2 to 25 keV. This is done by measuring the fluxes of electrons and ions through the use of cylindrical electrostatic analyzers and Spiraltron electron multipliers. The AE-C instrument contains three such detectors, one measuring electrons and one ions over the total energy range in 16 logarithmically-spaced steps each second, and one measuring 5 keV electrons continuously. Angular distributions are acquired during the spinning mode of the spacecraft. The D instrument contained 19 detectors, one ion stepped-energy analyzer, and two electron stepped analyzers at two different angles. In addition it contained 16 fixed-energy detectors which obtained high time-resolution angular distributions in the spacecraft one revolution-per-orbit mode at five energies between 0.72 and 18 keV.

1. Radio Science, 8, 393-400, April 1973.

DATA DESCRIPTION

The LEE data returned via telemetry are 8 bit logarithmically compressed words which represent the number of particles accumulated by each detector over 55.7 milliseconds. The stepped detectors have the voltage on the analyzer plates stepped synchronously once each telemetry (TM) minor frame to the next lowest energy in the 16 step sequence, and then recycled to the highest energy step. The accumulation of counts from all detectors in each instrument occurs over precisely the same time period, and the data are read out from each accumulator during the following minor frame. The actual particle energy measured during a minor frame can be determined from the telemetry of the analyzer plate voltage (TM word 128) of the preceding minor frame. The LEE instrument also uses 10 words in the 8 second subcom sequence to monitor other voltages and modes of the instrument. Table 1 gives a summary of LEE data and their position in the major frame for the C instrument and Table 2 for the D instrument. Table 3 provides the relation between the voltage on the analyzer plates and the step number.

DETECTOR PROPERTIES

1. Geometric factor:

   $G_o = 1.291 \times 10^{-4} \times EC \quad cm^2 - ster - keV$

   where EC is the center energy of the passband (keV). The values of G_o for each energy step are listed in Tables 4 and 5.

2. Passband

   An electrostatic analyzer has a relative passband independent of the center energy, or voltage on the analyzer plates:

   $\frac{\Delta E}{E} = 31\%$ or +17%, -14%.

   The specific numbers for each energy step are listed in Tables 4 and 5.

3. Efficiencies

   The efficiency of a Spiraltron detector is a function of the energy of the particle being measured, and the species of the particle. The efficiencies of electrons adopted for processing appear in Tables 4 and 5. Post launch analysis in isotropic flux regions has shown that the relative efficiencies of the AE-D detectors vary 20% from the values listed. The relative efficiencies can be obtained from the Investigator. The efficiency of ions adopted for processing was 1.00. However, the members of the LEE analysis team have adopted the following relationship between energy and efficiency:

Ion Energy (keV)	Efficiency (%)
≥ 10	100
5	98
3	93
2	88
1	67
0.5	40
0.3	24
0.2	14

TABLE 1 AE-C INSTRUMENT

TELEMETRY	DESCRIPTION
TM(43)*	Logarithmically compressed data word for the stepped electron detector.
TM(44)*	Logarithmically compressed data word for the stepped ion detector.
TM(45)*	Logarithmically compressed data word for the fixed electron detector.
TM(128)	Analyzer plate voltage.
TM(68,28)1,2	High voltage level.
TM(68,28)3	Spare.
TM(68,28)4	Calibrate mode flag.
TM(68,28)5,6,7	Spare.
TM(68,28:68,29)9,8,14	Threshold for the stepped electron detector.
TM(68,28:68,29)2,8,15	Threshold for the stepped ion detector.
TM(68,28:68,29)9,8,16	Threshold for the fixed energy electron detector.
TM*68,29)2,3	Calibrate amplitude.
TM(68,29)4,5	Calibrate frequency.
TM(68,30:68,31)	Minor mode command (zeros).
TM(68,57)	Low voltage monitor.
TM(68,58)	High voltage monitor.
TM(68,59)	Fixed energy detector high voltage.
TM(68,60)	Detector continuity.
TM(68,61)	Spare.
TM(68,106)7	High voltage flag.
TM(68,106)8	Sun sensor override.

* The formula for converting the compressed datum word to counts/readout (Q) is, $Q=(M+16)*2^{(10-C)}$ where M is the unsigned integer value of the last 4 bits and C is the unsigned integer value of the first 4 bits.

TABLE 2 AE-D INSTRUMENT

TELEMETRY	ENERGY (keV)	PARTICLE	ANGLE TO +Y AXIS
TM(10)	0.2 to 25 keV (16 steps)	electron	-7^0
TM(16)	6.88	electron	$+7^0$
TM(23)	0.2 to 25 keV (16 steps)	ion	$+60^0$
TM(36)	0.2 to 25 keV (16 steps)	electron	$+60^0$
TM(43)	2.62	electron	-7^0
TM(44)	2.62	electron	$+7^0$
TM(45)	1.38	electron	$+7^0$
TM(49)	0.72	electron	$+7^0$
TM(56)	0.72	electron	-7^0
TM(62)	1.38	electron	-7^0
TM(75)	6.88	electron	$+35^0$
TM(80)	2.62	electron	$+35^0$
TM(87)	1.38	electron	$+35^0$
TM(94)	0.72	electron	$+35^0$
TM(100)	2.62	electron	$+60^0$
TM(113)	1.38	electron	$+60^0$
TM(126)	0.72	electron	$+60^0$
TM(127)	18.1	electron	$+35^0/+7^0$*
TM(128)	Analyzer plate voltage	-	-
TM(68,59)	Fixed energy analyzer plate voltage.	-	-

*Toggled between main frames.

TABLE 3

V_{PLATES}	STEP #
1249	16
907	15
657	14
476	13
345	12
250	11
182	10
132	9
95	8
69	7
50	6
36	5
26	4
19	3
14	2
10	1

TABLE 4

Properties of the Stepped Energy Detectors, AE-C and D

STEP	EC	EMIN	EMAX	ΔE	EFF(1)	G_θ
16	24.90	20.978	28.635	7.657	.64	3.21E-03
15	18.08	15.216	20.978	5.762	.70	2.33
14	13.10	11.03	15.216	4.186	.72	1.69
13	9.50	7.993	11.03	3.037	.76	1.23
12	6.88	5.787	7.993	2.206	.80	8.88E-04
11	4.98	4.198	5.787	1.589	.82	6.43
10	3.62	3.045	4.198	1.153	.86	4.67
9	2.62	2.206	3.045	.839	.87	3.38
8	1.90	1.601	2.206	.605	.90	2.45
7	1.38	1.159	1.601	.442	.92	1.78
6	.996	.838	1.159	.321	.93	1.29
5	.722	.609	.838	.229	.94	9.32E-05
4	.524	.440	.609	.169	.95	6.76
3	.379	.318	.440	.122	.96	4.89
2	.273	.231	.318	.087	.95	3.52
1	.200	.170	.231	.061	.94	2.58

NOTE: 1. Efficiency for electrons.

TABLE 5

Properties of the Fixed Energy Detectors, ΔE-D

DET #	EC	EMIN	EMAX	ΔE	EFF	G_o
2	6.88	5.787	7.993	2.206	.80	8.88E-04
5	2.62	2.206	3.045	.839	.87	3.38E
6	2.62	2.206	3.045	.839	.87	3.38E
7	1.38	1.159	1.601	.442	.92	1.78E
8	.722	.609	.838	.229	.94	1.55E-05
9	.722	.609	.838	.229	.94	9.32E-05
10	1.38	1.159	1.601	.442	.92	1.78E-04
11	6.88	5.787	7.993	2.206	.80	8.88
12	2.62	2.206	3.045	.839	.87	3.38
13	1.38	1.159	1.601	.442	.92	1.78
14	.722	.609	.838	.229	.94	9.32
15	2.62	2.206	3.045	.839	.87	3.38
16	1.38	1.159	1.601	.442	.92	1.78
17	.722	.609	.838	.229	.94	9.32E-05
18	18.08	15.216	20.978	5.762	.70	2.33E-03
19	18.08	15.216	20.978	5.762	.70	2.33E-03

UNITS OF OUTPUT PARAMETERS

1. Differential Particle Flux:

   $$J = \frac{C}{EFF \cdot \Delta T \cdot G_0} \text{ particles/cm}^2\text{-sec-ster-keV}$$

   where C = counts/accumulation period

   T = accumulation period = 5.566×10^{-2} sec.

2. Differential Energy Flux:

   $$\xi = J \cdot EC \cdot S \text{ ergs/cm}^2\text{-sec-ster-keV}$$

   where S = 1.61×10^{-9} ergs/keV

3. Total Energy Flux:

   $$\xi_T = \sum_{i=1}^{16} \xi_i \cdot \Delta E_i$$

   $\text{ergs/cm}^2\text{-sec-ster}$

   where ξ_i = differential energy flux for the i^{th} step. The second sum is required for AE-C because the passbands of the detectors do not provide a continuous monitor of all energies.

GEOPHYSICAL UNIT FILE

The Geophysical Unit File represents a condensation of the telemetry words and a transformation to more scientifically meaningful units.

The file will have one physical record of fixed length (540 words) for every minute of data. Each physical record consists of 60 logical records, of 9 words each, containing values for one second of data. The date and time by which the physical record is accessed corresponds to the first logical record. The format of a logical record for data from AE-C is:

Word	Contents
1	Total energy flux for electrons
2	N_0 for electrons
3	E_0 for electrons
4	Correlation coefficient for electrons
5	Total energy flux for ions
6	E_0 for ions
7	N_0 for ions
8	Correlation coefficient for ions
9	RMS for the fixed energy electron detector

PARAMETER DESCRIPTION:

total energy = (ergs/cm^2-ster-sec) the total energy flux for a given particle determined from one second of data.

E_0 = (keV) the characteristic energy of the particles as determined by fitting one second of data to a Maxwellian velocity distribution function.

N_0 = (particles/cm^3) the characteristic density of the particles determined in the same manner as E_0.

Correlation Coefficient: $\dfrac{N \cdot SUM(X \cdot Y) - SUM\ X \cdot SUM\ Y}{((N \cdot SUM\ X^2 - SUM\ X \cdot SUM\ X) \cdot (N \cdot SUM\ Y^2 - SUM\ Y \cdot SUM\ Y))^{\frac{1}{2}}}$

RMS = (per cent) the rms of the measured values as compared to the averaged value, over one second of data, divided by the average.

It was found through experience that a single Maxwellian distribution did not usually represent the data. Thus, for AE-D the format for the logical record was changed to:

Word	Contents
1	Total flux for electrons in the energy range 0.2 to 0.8 keV.
2	Same for 0.8 to 2 keV.
3	Same for 2 to 7 keV.
4	Same for 7 to 25 keV.
5	Average energy for electrons.
6	Total electron flux.
7	Total energy flux for ions.
8	Average energy for ions.
9	Total ion flux.

UNIFIED ABSTRACT FILE

The Unified Abstract File is similar to the Geophysical Unit File except it provides 15 second summaries of the data.

The data are condensed using data from 7.5 seconds before and 7.5 seconds after the 15 second time mark, making available 15 stepping sequences for processing. However, when a spacecraft is in the 15 second spin mode, only data from the upper hemisphere are accepted, so that 7.5 sequences of the 16 steps from each detector are used.

Each record of the AE-C UA file contains 80 items for a 15 second period. The LEE items are:

ITEM NUMBER	DESCRIPTION
#15	Total energy flux for electrons.
#16	N_o for electrons.
#17	E_o for electrons.
#18	Correlation coefficient for electrons.
#19	Total energy flux for ions.
#20	N_o for ions.
#21	E_o for ions.
#22	Correlation coefficient for ions.

PARAMETER DESCRIPTION:

total energy = (ergs/cm^2-sec-ster) the average total energy flux from the upper hemisphere for a fifteen second period.

E_o = (keV) the characteristic energy of the particles as determined by fitting fifteen seconds of upper hemisphere data to a Maxwellian velocity distribution function.

N_o = (particles/cm^3) the characteristic density of the particles determined in the same manner as E_o.

Correlation Coefficient:

$$\frac{N \cdot \mathrm{SUM}(X \cdot Y) - \mathrm{SUM}\ X \cdot \mathrm{SUM}\ Y}{((N \cdot \mathrm{SUM}\ X^2 - \mathrm{SUM}\ X \cdot \mathrm{SUM}\ X) \cdot (N \cdot \mathrm{SUM}\ Y^2 - \mathrm{SUM}\ Y \cdot \mathrm{SUM}\ Y))^{1/2}}$$

Each record of the AE-D UA file contains 84 items. The LEE items are:

ITEM NUMBER	DESCRIPTION
15	Total energy flux for electrons, 0.2 to 0.8 keV.
16	Same, 0.8 to 2 keV.
17	Same, 2 to 7 keV.
18	Same, 7 to 25 keV.
19	Average energy for electrons.
20	Total electron flux.
21	Total energy flux for ions.
22	Average energy for ions.
23	Total ion flux.

```
ORG     GRAN    REC   LAST MODIFIED       NAME

K 3       6     163   15:32   6 OCT 77   UAFILEDEF  WRITE=ALL

***** DEFINITIONS OF WORDS IN UNIFIED ABSTRACT FILE *****
*                    SATELLITE C
  A.  RECORDS WRITTEN BY UAWRIT (15 SECOND INTERVALS)
BIMS ION CONCENTRATIONS (IONS/CM**3) FOR THE FOLLOWING IONS:
  1.  BIMS - H+
  2.  BIMS - HE+
  3.  BIMS - N+
  4.  BIMS - O+
  5.  BIMS - N2+
  6.  BIMS - NO+
  7.  BIMS - O2+
  8.  BIMS - SELECTED ION #1
  9.  BIMS - SELECTED ION #2
 10.  BIMS - SELECTED ION #3
 11.  CEP - ELECTRON TEMPERATURE (DEG KELVIN)

 12.  CEP - ION      DENSITY (NUM/CM3)

 13.  CEP - SATELLITE POTENTIAL (VOLTS) (ERROR NOT ENCODED IN LAST 10 BITS)
 14.  CEP - MEAN ION MASS FROM ION CURRENT
 15.  LEE  - TOTAL ENERGY FLUX (ERGS/(CM*CM-SEC-STER)) - ELECTRONS
 16.  LEE  - N0 (ELECTRONS/(CM*CM*CM))                - ELECTRONS
 17.  LEE  - E0 (KEV)                                  - ELECTRONS
 18.  LEE  - CORRELATION COEFFICIENT                   - ELECTRONS
 19.  LEE  - TOTAL ENERGY (ERGS/(CM*CM-SEC-STER))      - PROTONS
 20.  LEE  - N0 (PROTONS/(CM*CM*CM))                   - PROTONS
 21.  LEE  - E0 (KEV)                                  - PROTONS
 22.  LEE  - CORRELATION COEFFICIENT                   - PROTONS
 23.  MESA -ATMOSPHERIC DENSITY (GM/CM**3)
 24.  MESA -TRANSVERSE WIND COMPONENT (M/SEC. )
 25.  MIMS - H+
 26.  MIMS - D+
 27.  MIMS - HE+
 28.  MIMS - O++
 29.  MIMS - N+
 30.  MIMS - O+
 31.  MIMS - MG+
 32.  MIMS - N2+
 33.  MIMS - NO+
 34.  MIMS - O2+
 35.  NACE - N2 DENSITY (NUM/CM3)
 36.  NACE - O DENSITY (NUM/CM3)
 37.  NACE - HE DENSITY (NUM/CM3)

 38.  NACE - ARGON DENSITY (NUM/CM3)

 39.  NACE - SELECTION 1: INITIALLY NO DENSITY (NUM/CM3)
 40.  NACE - SELECTION 2: INITIALLY TOTAL OXYGEN (NUM/CM3)
 41.  NATE - NEUTRAL GAS TEMPERATURE (DEG KELVIN)
 42.  NATE - N2 DENSITY (NUM/CM3)
 43.  NATE - O+2*O2 TOTAL OXYGEN DENSITY (NUM/CM3)
 44.  NATE - HE DENSITY (NUM/CM3)
 45.  NATE - ARGON DENSITY (NUM/CM3)
 46.  OSS  - N2 DENSITY          (NUM/CM3)
 47.  OSS  - O2 DENSITY          (NUM/CM3)
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48. OSS   - HE DENSITY           (NUM/CM3)
49. OSS   - O  DENSITY           (NUM/CM3)
50. OSS   - AR DENSITY           (NUM/CM3)
51. OSS   - X  DENSITY OF SELECTED MASS (NUM/CM3) (IF X=32, X DENS. IS O/2+O2)
52. PES   - AVERAGE FLUX 2-3 EV  (NUM/CM2-EV-SR-SEC)
53. PES   - AVERAGE FLUX  7-9 EV (NUM/CM2-EV-SR-SEC)
54. PES   - AVERAGE FLUX  12-17 EV  (NUM/CM2-EV-SR-SEC)
55. PES   - AVERAGE FLUX  25-30 EV  (NUM/CM2-EV-SR-SEC)
56. PES   - AVERAGE FLUX  37-47 EV  (NUM/CM2-EV-SR-SEC)
57. PES   - AVERAGE FLUX  100-500 EV  (NUM/CM2-EV-SR-SEC)
58. RPA   - TI ... ION TEMPERATURE IN (DEG KELVIN)
59. RPA   - NP ...  TOTAL (ION OR ELECTRON) PLASMA CONCENTRATION (CM-3)
60. RPA   -  VD ... PLASMA DRIFT VELOCITY NORMAL TO RPA (M/SEC)
61. RPA   -  PSI .. SATELLITE POTENTIAL (VOLTS)
62. RPA   - VY .. TRANSVERSE VERTICAL   ION VELOCITY ASSUMING VD=0.0
63. RPA   - VZ .. TRANSVERSE HORIZONTAL ION VELOCITY ASSUMING VD=0.0
64. RPA   - SIGMA .. ROUGHNESS PARAMETER  (DELTA NI)/(NI) %
65. RPA   -
66. RPA   -
67. UVNO - NO SCALE HT AT S/C ALT            (UNRELIABLE AS YET)
68. UVNO - NO NUM DENS AT S/C ALT            (GOOD)
69. UVNO - NO NUM DENS AT 150 KM             (FILL)
70. UVNO - MAX NO NUM DENS                   (FILL)
71. UVNO - ALT AT WHICH MAX NO OCCURS        (FILL)
72. VAE - CH1 UP IF FILTER WHEEL FIXED; CH2 3371A IF STEPPING(RAYLEIGHS)
73. VAE - CH1 DOWN IF FILTER WHEEL FIXED; CH2 4278A IF STEPPING(RAYLEIGHS)
74. VAE - CH1 BACK IF FILTER WHEEL FIXED; CH2 5200A IF STEPPING(RAYLEIGHS)
75. VAE - CH1 FORWARD IF FILTER WHEEL FIXED; CH2 5577A IF STEPPING(RAYLEIGHS)
76. VAE - CH2 UP IF FILTER WHEEL FIXED; CH2 6300A IF STEPPING(RAYLEIGHS)
77. VAE - CH2 DOWN IF FILTER WHEEL FIXED; CH2 7319A IF STEPPING(RAYLEIGHS)
78. NATE VERTICAL WINDS (+ IS UPWARD)
79. OSS   - N  DENSITY           (NUM/CM3)
80. ORBIT NUMBER
*
 B.  RECORDS WRITTEN BY HDWRIT
*
*                  INDEX TO LINE NUMBERS:
*

    BIMS    BBBB-EEEE.999          PES     BBBB-EEEE.999
    CEP     BBBB-EEEE.999          RPA     BBBB-EEEE.999
    ESUM    BBBB-EEEE.999          UVNO    BBBB-EEEE.999
    EUVS    BBBB-EEEE.999          VAE     BBBB-EEEE.999
    LEE     BBBB-EEEE.999          SPARES   241- 250.999
    MESA     151- 160.999          ESUM    BBBB-EEEE.999
    MIMS    BBBB-EEEE.999          UVNO    BBBB-EEEE.999
    NACE     171- 180.999          VAE     BBBB-EEEE.999
    NATE     181- 190.999          EUVS    BBBB-EEEE.999
    OSS      191- 200.999
*
*
*
51. MESA -START TIME OF MESA DATA (MILLISEC.)
52. MESA -END TIME OF MESA DATA (MILLISEC.)
53. MESA -DENSITY CODE
54. MESA -DATA DATE (YYDDD)
55. MESA -PROCESSING DATE (YYDDD)
56. MESA
57. MESA
58. MESA
59. MESA
NACE - UA PROCESSING DATE (INTEGER YYDDD)
72. NACE - MASS NUMBER FOR SELECTION 1 (INTEGER)
73. NACE - MASS NUMBER FOR SELECTION 2 (INTEGER; 49=TOTAL OXYGEN)
74. NACE - QUALITY CODE:0-PRELIM;10-FINAL CAL BUT NO GAS-SURF CORR
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75.  NACE -
76.  NACE -
77.  NACE -
78.  NACE -
79.  NACE -
81.  NATE - TEMP QUALITY(BITS 1-19), DATE ENTERED(BITS 20-32)
82.  NATE - UNASSIGNED
83.  NATE - UNASSIGNED
84.  NATE - DATA DATE(BITS 1-13), PROCESSING DATE(BITS 14-26),
            NUMBER OF TIMES PROCESSED(BITS 27-32)
85.  NATE - START AND STOP UATIMES(BITS 1-13 AND 14-26)
86.  NATE - MIN AND MAX UA TEMPS(BITS 1-16 AND 17-32)
87.  NATE - 32 MINOR MODE COMMAND BITS
88.  NATE - PROCESSING DATE FOR UA DENSITY DATA
89.  NATE - QUALITY INDICATOR FOR UA DENSITY DATA
91.  OSS  - DATE OF LAST REVISION (DLR) AND TIME OF LAST REVISION (TLR)
*
            THIS WORD IS UPDATED WHENEVER PART OF THE ORBIT IS REPROCESSED
            DLR IS UPPER 14 BITS AND TLR IS LOWER 18 BITS. JULIAN DATE
            AND TIME ARE OBTAINED BY THE FOLLOWING COMPUTATION:
               IDATE= ISL(IWORD91,-18)+70000
               ITIME= 1000*IAND(IWORD91,Z3FFFF)          (IN MSEC.)
*
92.  OSS  - MODIFY COUNTERS FOR THE 6 OSS WORDS IN THE UA FILE (UPPER 6
            HEX DIGITS) PLUS THE MASS OF X  (LOWER 2 HEX DIGITS). THE 6
            COUNTERS ARE INITIALLY =0. WHENEVER THE J-TH OSS WORD IN THE
            UAFILE FOR THIS ORBIT IS REVISED, THE J-TH HEX DIGIT IS
            INCREMENTED BY 1. A CHANGE IN WORD 92 INDICATES THAT AT LEAST
            ONE OF THE UA FILE WORDS HAS BEEN UPDATED.
*
            THE MODIFY COUNTER OF THE J-TH UA WORD, MJ, IS
               MJ= IAND(ISC(IWORD92,J*4),Z2FF)
            AND
               MASS OF X= IAND(IWORD92,4ZFFFF)
*
93.  OSS  - DATE OF GU HEADER RECORD, A RECORD IN THE GU FILE.
94.  OSS  - TIME OF GU HEADER RECORD, A RECORD IN THE GU FILE.
*
            THE GU HEADER RECORD DATE AND TIME ENABLE THE USER TO ACCESS
            THE MORE DETAILED GU FILE DATA AND GU HEADER RECORD. EVENTUALLY
            WE EXPECT TO ENTER INFORMATION RELATING TO PROCESSING CONDITIONS
            IN THAT RECORD.
*
95.  OSS  - TO BE ASSIGNED
96.  OSS  - TO BE ASSIGNED
97.  OSS  - TO BE ASSIGNED
98.  OSS  - TO BE ASSIGNED
99.  OSS  - TO BE ASSIGNED
```

!^

***** DEFINITIONS OF WORDS IN UNIFIED ABSTRACT FILE *****

* SATELLITE D

A. RECORDS WRITTEN BY UAWRIT (15 SECOND INTERVALS)

1. PACT -
2. PACT -
3. PACT -
4. PACT -
5. PACT -
6. PACT -
7. PACT -
8. PACT -
9. PACT -
10. PACT -
11. CEP - ELECTRON TEMPERATURE (DEG KELVIN)
12. CEP - ION DENSITY (NUM/CC)
13. CEP - VEHICLE POTENTIAL (VOLTS) ERROR BAR NOT ENCODED
14. CEP - MEAN ION MASS FROM ION CURRENT (AMU)
15. LEE - ELECTRON TOTAL ENERGY FLUX (ERGS/(SEC*CM**2*STER)) .2-.8KEV
16. LEE - ELECTRON TOTAL ENERGY FLUX (ERGS/(SEC*CM**2*STER)) .8-2. KEV
17. LEE - ELECTRON TOTAL ENERGY FLUX (ERGS/(SEC*CM**2*STER)) 2.-8. KEV
18. LEE - ELECTRON TOTAL ENERGY FLUX (ERGS/(SEC*CM**2*STER)) 8-30. KEV
19. LEE - ELECTRON AVERAGE ENERGY (KEV)
20. LEE - ELECTRON TOTAL PARTICLE FLUX(NUM/(SEC*CM**2*STER)).2-30KEV
21. LEE - PROTON TOTAL ENERGY FLUX (ERGS/(SEC*CM**2*STER)) .2-30. KEV
22. LEE - PROTON AVERAGE ENERGY (KEV)
23. LEE - PROTON TOTAL PARTICLE FLUX (NUM/(SEC*CM**2*STER)) .2-30KEV
24. MESA - ATMOSPHERIC DENSITY (GM/CM**3)
25. MESA - TRANSVERSE WIND COMPONENT (M/SEC.)
26. MIMS - H+
27. MIMS - D+
28. MIMS - HE+
29. MIMS - O++
30. MIMS - N+
31. MIMS - O+
32. MIMS - MG+
33. MIMS - N2+
34. MIMS - NO+
35. MIMS - O2+
36. NACE - N2 DENSITY (NUM/CM3)
37. NACE - O DENSITY (NUM/CM3)
38. NACE - HE DENSITY (NUM/CM3)
39. NACE - ARGON DENSITY (NUM/CM3)
40. NACE - SELECTION 1: INITIALLY NO DENSITY (NUM/CM3)
41. NACE - SELECTION 2: INITIALLY TOTALOXYGEN (NUM/CM3)
42. NATE - NEUTRAL GAS TEMPERATURE (DEG KELVIN)
43. NATE - N2 DENSITY (NUM/CM3)
44. NATE - O+2*O2 TOTAL OXYGEN DENSITY (NUM/CM3)
45. NATE - HE DENSITY (NUM/CM3)
46. NATE - ARGON DENSITY (NUM/CM3)
47. NATE - UA WINDS (METERS/SEC, + IS EASTWARD)
48. NATE -
49. OSS - N2 DENSITY (NUM/CM3)
50. OSS - O2 DENSITY (NUM/CM3)
51. OSS - HE DENSITY (NUM/CM3)
52. OSS - O DENSITY (NUM/CM3)
53. OSS - AR DENSITY (NUM/CM3)
54. OSS - X DENSITY OF SELECTED MASS (NUM/CM3) (IF X=32, X DENS. IS O/2+O2)
55. OSS - N DENSITY (NUM/CM3)
56. PES - AVERAGE FLUX 2-3 EV

57. PES - AVERAGE FLUX 7-9 EV
58. PES - AVERAGE FLUX 12-17 EV
59. PES - AVERAGE FLUX 25-30 EV
60. PES - AVERAGE FLUX 37-47 EV
61. PES - AVERAGE FLUX 100-500 EV
62. RPA - TI ... ION TEMPERATURE IN (DEG - KELVIN)
63. RPA - NP ... TOTAL (ION OR ELECTRON) PLASMA CONCENTRATION (CM-3)
64. RPA - VD ... PLASMA DRIFT VELOCITY NORMAL TO RPA (M/SEC)
65. RPA - PSI .. SATELLITE POTENTIAL (VOLTS)
66. RPA - VY .. TRANSVERSE VERTICAL ION VELOCITY ASSUMING VD=0.0
67. RPA - VZ .. TRANVERSE HORIZONTAL ION VELOCITY ASSUMING VD=0.0
68. RPA - SIGMA .. ROUGHNESS PARAMETER (DELTA NI)/(NI) %
69. RPA -
70. RPA -
71. UVNO -
72. UVNO -
73. UVNO -
74. UVNO -
75. UVNO -
76. VAE - CH1 UP IF FILTER WHEEL FIXED; CH2 4278A IF STEPPING(RAYLEIGHS)
77. VAE - CH1 DOWN IF FILTER WHEEL FIXED; CH2 4861A IF STEPPING(RAYLEIGHS)
78. VAE - CH1 BACK IF FILTER WHEEL FIXED; CH2 5200A IF STEPPING(RAYLEIGHS)
79. VAE. - CH1 FORWARD IF FILTER WHEEL FIXED; CH2 5577A IF STEPPING(RAYLEIGHS)
80. VAE - CH2 UP IF FILTER WHEEL FIXED; CH2 6300A IF STEPPING(RAYLEIGHS)
81. VAE - CH2 DOWN IF FILTER WHEEL FIXED; CH2 7319A IF STEPPING(RAYLEIGHS)
82. ORBIT
83. DATE
84. TIME
*
B. RECORDS WRITTEN BY HDWRIT
*
* INDEX TO LINE NUMBERS:
*

BIMS	BBBB-EEEE.999	PES	BBBB-EEEE.999
CEP	BBBB-EEEE.999	RPA	BBBB-EEEE.999
ESUM	BBBB-EEEE.999	UVNO	BBBB-EEEE.999
EUVS	BBBB-EEEE.999	VAE	BBBB-EEEE.999
LEE	BBBB-EEEE.999	SPARES	241- 250.999
MESA	151- 160.999	ESUM	BBBB-EEEE.999
MIMS	BBBB-EEEE.999	UVNO	BBBB-EEEE.999
NACE	171- 180.999	VAE	BBBB-EEEE.999
NATE	181- 190.999	EUVS	BBBB-EEEE.999
OSS	191- 200.999		

*
*
*
51. MESA -START TIME OF MESA DATA (MILLISEC.)
52. MESA -END TIME OF MESA DATA (MILLISEC.)
53. MESA -DENSITY CODE
54. MESA -DATA DATE
55. MESA -PROCESSING DATE
56. MESA
57. MESA
58. MESA
59. MESA
NACE - UA PROCESSING DATE (INTEGER YYDDD)
72. NACE - MASS NUMBER FOR SELECTION 1 (INTEGER)
73. NACE - MASS NUMBER FOR SELECTION 2 (INTEGER; 49=TOTAL OXYGEN)
74. NACE - QUALITY CODE:0-PRELIM;10-FINAL CAL BUT NO GAS-SURF CORR.
75. NACE -
76. NACE -
77. NACE -
78. NACE -

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79. NACE -
81. NATE - TEMP QUALITY(BITS 1-19), DATE ENTERED(BITS 20-32)
82. NATE - UNASSIGNED
83. NATE - UNASSIGNED
84. NATE - DATA DATE(BITS 1-13), PROCESSING DATE(BITS 14-26),
           NUMBER OF TIMES PROCESSED(BITS 27-32)
85. NATE - START AND STOP UATIMES(BITS 1-13 AND 14-26)
86. NATE - MIN AND MAX UA TEMPS(BITS 1-16 AND 17-32)
87. NATE - 32 MINOR MODE COMMAND BITS
88. NATE - PROCESSING DATE FOR UA DENSITY DATA
89. NATE - QUALITY INDICATOR FOR UA DENSITY DATA
91. OSS  - DATE OF LAST REVISION (DLR) AND TIME OF LAST REVISION (TLR)
*
           THIS WORD IS UPDATED WHENEVER PART OF THE ORBIT IS REPROCESSED
           DLR IS UPPER 14 BITS AND TLR IS LOWER 18 BITS. JULIAN DATE
           AND TIME ARE OBTAINED BY THE FOLLOWING COMPUTATION:
              IDATE= ISL(IWORD91,-18)+70000
              ITIME= 1000*IAND(IWORD91,5Z3FFFF)          (IN MSEC.)
*
92. OSS  - MODIFY COUNTERS FOR THE 6 OSS WORDS IN THE UA FILE (UPPER 6
           HEX DIGITS) PLUS THE MASS OF X  (LOWER 2 HEX DIGITS). THE 6
           COUNTERS ARE INITIALLY =0. WHENEVER THE J-TH OSS WORD IN THE
           UAFILE FOR THIS ORBIT IS REVISED, THE J-TH HEX DIGIT IS
           INCREMENTED BY 1. A CHANGE IN WORD 92 INDICATES THAT AT LEAST
           ONE OF THE UA FILE WORDS HAS BEEN UPDATED.
*
           THE MODIFY COUNTER OF THE J-TH UA WORD, MJ, IS
              MJ= IAND(ISC(IWORD92,J*4),Z2FF)
           AND
              MASS OF X= IAND(IWORD92,4ZFFFF)
*
93. OSS  - DATE OF GU HEADER RECORD, A RECORD IN THE GU FILE.
94. OSS  - TIME OF GU HEADER RECORD, A RECORD IN THE GU FILE.
*
           THE GU HEADER RECORD DATE AND TIME ENABLE THE USER TO ACCESS
           THE MORE DETAILED GU FILE DATA AND GU HEADER RECORD. EVENTUALLY
           WE EXPECT TO ENTER INFORMATION RELATING TO PROCESSING CONDITIONS
           IN THAT RECORD.
*
95. OSS  - TO BE ASSIGNED
96. OSS  - TO BE ASSIGNED
97. OSS  - TO BE ASSIGNED
98. OSS  - TO BE ASSIGNED
99. OSS  - TO BE ASSIGNED
```

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!~
***** DEFINITIONS OF WORDS IN UNIFIED ABSTRACT FILE *****
*                         SATELLITE E
  A.  RECORDS WRITTEN BY UAWRIT (15 SECOND INTERVALS)
 1. BIMS - H+
 2. BIMS - HE+
 3. BIMS - N+
 4. BIMS - O+
 5. BIMS - N2+
 6. BIMS - NO+
 7. BIMS - O2+
 8. BIMS -
 9. BIMS -
10. BIMS -
11. CEP - ELECTRON TEMPERATURE (DEG KELVIN)
12. CEP - ION DENSITY (NUM/CC)
13. CEP - SATELLITE POTENTIAL (VOLTS)  ERROR BAR NOT ENCODED
14. CEP - MEAN ION MASS FROM ION CURRENT (AMU)
15. BUV  - OZONE MIXING RATIO AT 0.4 MB PRESSURE LEVEL
16. BUV  - OZONE MIXING RATIO AT 1 MB PRESSURE LEVEL
17. BUV  - OZONE MIXING RATIO AT 2.0 MB PRESSURE LEVEL
18. BUV  - OZONE MIXING RATIO AT 5.0 MB PRESSURE LEVEL
19. BUV  - OZONE MIXING RATIO AT 10.0 MB PRESSURE LEVEL
20. BUV  - OZONE MIING RATIO AT 30.0 MB PRESSURE LEVEL
21. BUV  - TOTAL OZONE DENSITY
22. BUV  -
23. MESA - ATMOSPHERIC DENSITY (GM/CM**3)
24. MESA - TRANSVERSE WIND COMPONENT (M/SEC.)
25. EAST -
26. EAST -
27. EAST -
28. EAST -
29. EAST -
30. EAST -
31. EAST -
32. EAST -
33. EAST -
34. EAST -
35. NACE - N2 DENSITY (NUM/CM3)
36. NACE - O DENSITY (NUM/CM3)
37. NACE - HE DENSITY (NUM/CM3)
38. NACE - ARGON DENSITY (NUM/CM3)
39. NACE - SELECTION 1: INITIALLY NO DENSITY (NUM/CM3)
40. NACE - SELECTION 2: INITIALLY TOTAL OXYGEN (NUM/CM3)
41. NATE - NEUTRAL GAS TEMPERATURE (DEG KELVIN)
42. NATE - N2 DENSITY (NUM/CM3)
43. NATE - O+O2 TOTAL OXYGEN DENSITY (NUM/CM3)
44. NATE - HE DENSITY (NUM/CM3)
45. NATE - ARGON DENSITY (NUM/CM3)
46. NATE - UA WINDS (METERS/SEC, + IS SOUTHWARD)
47. NATE - VERTICAL UA WINDS(+ IS UPWARD)
48. OSS  - N2 DENSITY           (NUM/CM3)
49. OSS  - O2 DENSITY           (NUM/CM3)
50. OSS  - HE DENSITY           (NUM/CM3)
51. OSS  - O  DENSITY           (NUM/CM3)
52. OSS  - AR DENSITY           (NUM/CM3)
53. OSS  - X  DENSITY OF SELECTED MASS (NUM/CM3) (IF X=32,X DENS. IS O/2+O2)
54. OSS  - N  DENSITY           (NUM/CM3)

55. PES  - AVERAGE FLUX 2-3 EV
56. PES  - AVERAGE FLUX 7-9 EV
57. PES  - AVERAGE FLUX 12-17 EV
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58. PES  - AVERAGE FLUX 25-30 EV
59. PES  - AVERAGE FLUX 37-47 EV
60. PES  - AVERAGE FLUX 100-500 EV
61. RPA - TI ... ION TEMPERATURE IN (DEG KELVIN)
62. RPA - NP ... TOTAL(ION OR ELECTRON) PLASMA CONCENTRATION (CM-3)
63. RPA - VD ... PLASMA DRIFT VELOCITY NORMAL TO RPA (M/SEC)
64. RPA - PSI .. SATELLITE POTENTIAL (VOLTS)
65. RPA  - VY ... TRANSVERSE VERTICAL ION VELOCITY ASSUMING VD=0.0
66. RPA  - VZ ... TRANSVERSE HORIZONTAL ION VELOCITY ASSUMING VD=0.0
67. RPA  - SIGMA .. ROUGHNESS PARAMETER (DELTA NI)/(NI) %
68. RPA  -
69. RPA  -
70. VAE - CH1 UP IF FILTER WHEEL FIXED; CH2 2800A IF STEPPING(RAYLEIGHS)
71. VAE - CH1 DOWN IF FILTER WHEEL FIXED; CH2 5200A IF STEPPING(RAYLEIGHS)
72. VAE - CH1 BACK IF FILTER WHEEL FIXED; CH2 5577A IF STEPPING(RAYLEIGHS)
73. VAE - CH1 FORWARD IF FILTER WHEEL FIXED; CH2 6300A IF STEPPING(RAYLEIGHS)
74. VAE - CH2 UP IF FILTER WHEEL FIXED; CH2 6563A IF STEPPING(RAYLEIGHS)
75. VAE - CH2 DOWN IF FILTER WHEEL FIXED; CH2 7319A IF STEPPING(RAYLEIGHS)
76. ORBIT
77. DATE
78. TIME
*
 8.  RECORDS WRITTEN BY HDWRIT
*
*                     INDEX TO LINE NUMBERS:
*
     BIMS    BBBB-EEEE.999          PES     BBBB-EEEE.999
     CEP     BBBB-EEEE.999          RPA     BBBB-EEEE.999
     ESUM    BBBB-EEEE.999          UVNO    BBBB-EEEE.999
     EUVS    BBBB-EEEE.999          VAE     BBBB-EEEE.999
     LEE     BBBB-EEEE.999          SPARES   241- 250.999
     MESA     151- 160.999          ESUM    BBBB-EEEE.999
     MIMS    BBBB-EEEE.999          UVNO    BBBB-EEEE.999
     NACE     171- 180.999          VAE     BBBB-EEEE.999
     NATE     181- 190.999          EUVS    BBBB-EEEE.999
     OSS      191- 200.999
*
*
*
51. MESA -START TIME OF MESA DATA (MILLISEC.)
52. MESA -END TIME OF MESA DATA (MILLISEC.)
53. MESA -DENSITY CODE
54. MESA -DATA DATE
55. MESA -PROCESSING DATE
56. MESA
57. MESA
58. MESA
59. MESA
NACE - UA PROCESSING DATE (INTEGER YYDDD)
72. NACE - MASS NUMBER FOR SELECTION 1 (INTEGER)
73. NACE - MASS NUMBER FOR SELECTION 2 (INTEGER; 49=TOTAL OXYGEN)
74. NACE - QUALITY CODE:0-PRELIM;10-FINAL CAL BUT NO GAS-SURF CORR.

75. NACE -

76. NACE -
77. NACE -

78. NACE -
79. NACE -
81. NATE - TEMP QUALITY(BITS 1-19), DATE ENTERED(BITS 20-32)
82. NATE - UNASSIGNED
83. NATE - UNASSIGNED
84. NATE - DATA DATE(BITS 1-13), PROCESSING DATE(BITS 14-26),
           NUMBER OF TIMES PROCESSED(BITS 27-32)
85. NATE - START AND STOP UATIMES(BITS 1-13 AND 14-26)
```

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86. NATE - MIN AND MAX UA TEMPS(BITS 1-16 AND 17-32)
87. NATE - 32 MINOR MODE COMMAND BITS
88. NATE - PROCESSING DATE FOR UA DENSITY DATA
89. NATE - QUALITY INDICATOR FOR UA DENSITY DATA
91. OSS  - DATE OF LAST REVISION (DLR) AND TIME OF LAST REVISION (TLR)
*
           THIS WORD IS UPDATED WHENEVER PART OF THE ORBIT IS REPROCESSED
           DLR IS UPPER 14 BITS AND TLR IS LOWER 18 BITS. JULIAN DATE
           AND TIME ARE OBTAINED BY THE FOLLOWING COMPUTATION:
              IDATE= ISL(IWORD91,-18)+70000
              ITIME= 1000*IAND(IWORD91,5Z3FFFF)          (IN MSEC.)
*
92. OSS  - MODIFY COUNTERS FOR THE 6 OSS WORDS IN THE UA FILE (UPPER 6
           HEX DIGITS) PLUS THE MASS OF X  (LOWER 2 HEX DIGITS). THE 6
           COUNTERS ARE INITIALLY =0. WHENEVER THE J-TH OSS WORD IN THE
           UAFILE FOR THIS ORBIT IS REVISED, THE J-TH HEX DIGIT IS
           INCREMENTED BY 1. A CHANGE IN WORD 92 INDICATES THAT AT LEAST
           ONE OF THE UA FILE WORDS HAS BEEN UPDATED.
*
           THE MODIFY COUNTER OF THE J-TH UA WORD, MJ, IS
              MJ= IAND(ISC(IWORD92,J*4),2ZFF)
           AND
              MASS OF X= IAND(IWORD92,4ZFFFF)
*
93. OSS  - DATE OF GU HEADER RECORD, A RECORD IN THE GU FILE.
94. OSS  - TIME OF GU HEADER RECORD, A RECORD IN THE GU FILE.
*
           THE GU HEADER RECORD DATE AND TIME ENABLE THE USER TO ACCESS
           THE MORE DETAILED GU FILE DATA AND GU HEADER RECORD. EVENTUALLY
           WE EXPECT TO ENTER INFORMATION RELATING TO PROCESSING CONDITIONS
           IN THAT RECORD.
*
95. OSS  - TO BE ASSIGNED
96. OSS  - TO BE ASSIGNED
97. OSS  - TO BE ASSIGNED
98. OSS  - TO BE ASSIGNED
99. OSS  - TO BE ASSIGNED
```

D - 35043
AE - C
02/28/75 - 03/31/75
DAY 59
LABEL

DUMP OF TAPE B2OUT2A

INPUT TAPE B2OUT2A ON MT1
DATA INPUT H9 NF 128 FL 1 1 1 SR 128 1 1 SR 128 LAST 1

FILE 1 RECORD 1 LENGTH 4480BYTES

25 year 1 Month Y D Start Date End Date

FILE										
(0)	0000004B	00000003	00000000	0000007E	00000081	00000000	00012533	04F2DC68	00012552	04D171B8
(40)	00000000	00000000	000006A4	0000006D	00000698	0000168D	0000168F	00001691	00001692	0000169C
(80)	000016A0	000016A1	000016A4	000016A8	000016A9	000016AC	000016AD	000016B[illegible]	000016B1	000016B4
(120)	000016B8	000016B9	000016BE	000016C0	000016C1	000016C2	000016C3	000016CB	000016D0	000016D1
(160)	000016D2	000016D3	000016DC	000016DE	000016E0	000016E1	000016E2	000016E3	000016E4	000016E5
(200)	000016E6	000016E8	000016EA	000016EC	000016EE	00001700	00001701	00001702	00001703	0000170C
(240)	0000170D	0000170E	0000170F	00001711	00001714	00001717	00001718	00001719	0000171A	0000171D
(280)	0000171E	0000171F	00001721	00001724	00001727	00001729	00001739	0000173A	00001744	00001745
(320)	00001747	0000174E	00001751	00001752	00001754	00001757	0000175E	0000175F	0000176F	00001770
(360)	0000177F	00001780	00001790	00001792	00001798	000017A4	000017A6	000017BD	000017BF	000017CC
(400)	000017DD	000017F3	000017F8	0000180B	00001812	0000181D	00001827	0000182D	00001836	0000183E
(440)	00001849	0000184C	0000184E	00001850	00001851	00001852	00001856	00001858	00001859	0000185C
(480)	0000185E	00001860	00001861	00001862	00001864	00001866	00001868	00001869	0000186A	0000186B
(520)	0000186C	0000186D	0000186E	0000186F	00001870	00001871	00001879	0000187B	0000187C	0000187D
(560)	0000187E	0000187F	00001880	00001881	00000000	00000000	00000000	00000000	00000000	00000000
(600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(800)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(920)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1000)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1040)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1080)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1400)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1600)	00012533	00000007	0000000C	0000000C	00000005	00000007	0000000C	00000016	00000016	0000000C
(1640)	00000014	0000001B	0000001B	0000000D	00000014	0000001B	00000025	00000025	000000[illegible]F	4246[illegible]
(1680)	4244999A	00000000	00012534	0000001B	00000012	00000027	00000016	00000017	00000012	00000012
(1720)	00000016	00000015	00000028	00000021	0000002F	00000025	00000014	00000021	00000021	00000025
(1760)	00000118	4248[illegible]	4246B333	00000000	00012535	00000016	0000000F	00000006	00000009	00000007
(1800)	00000026	00000027	0000000C	0000000A	00000025	0000001E	00000011	00000017	00000014	00000011
(1840)	00000014	0000001B	000000BE	424A0000	42466666	00000000	00012536	0000000F	00000007	00000005
(1880)	00000007	00000009	0000000C	00000012	00000012	0000000B	0000001E	00000014	0000000D	00000014
(1920)	00000017	0000001B	00000021	00000021	000000C8	424A0000	42496666	00000000	00012537	00000012
(1960)	0000000C	00000009	00000007	00000006	00000003	00000005	00000009	00000009	00000021	0000001B
(2000)	00000017	00000014	00000011	00000007	0000000D	00000017	000000A3	4249[illegible]	4248CCCD	00000000
(2040)	00012538	00000012	0000001B	0000001B	00000003	00000027	00000027	0000001B	00000012	0000001E
(2080)	00000021	00000028	00000028	00000032	0000002F	0000002F	00000028	00000021	0000014A	424[illegible]
(2120)	42474CCD	00000000	00012539	00000009	00000012	0000001B	00000016	0000000F	0000002[illegible]	00000012
(2160)	00000016	00000014	00000017	00000021	00000028	00000025	0000001E	0000002B	00000021	00000025
(2200)	00000115	424A[illegible]	42486666	[illegible]	0001253A	00000004	00000004	00000002	00000003	00000003
(2240)	00000003	00000003	00000004	00000003	0000000A	0000000A	0000002[illegible]	00000007	[illegible]7	[illegible]
(2280)	00000007	0000000A	0000003C	4249[illegible]	4247E666	00000000	000125[illegible]	[illegible]	[illegible]	[illegible]

(5520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5800)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5920)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6000)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6040)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6080)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6400)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	4258FD42	42440489
(6760)	3E23BE7D	4419CAA8	4286DDE2	43110511	C0ED4AB8	BF638FB8	405FDD1D	42E41E99	42DCEACC	44187F00

1638 12(

FILE 128 RECORD 9 LENGTH 6552BYTES

→(0)	00012552	041931C0	4698967F	41100000	412020F9	40FBC285	402A9215	40127563	C5224078	C54FA60D
(40)	C5218D3F	43635450	4412C641	441083FF	C123BE70	41552D74	C1534201	C11E22E1	415352C3	C1534201
(80)	42E23E00	4228CEF4	C22B59B0	42E23E00	4228CEF4	421C23ED	42169BB6	4123D237	42300FCF	4[illegible]71EE8
(120)	BFFE3601	C06BA753	C01BEBFF	C0E4B9BC	C06BF841	C02AB9E2	423F4FA6	4361ADEE	4412DFC4	4410D2DD
(160)	C32A4128	43F1D79C	C414E508	422835BF	C22AFA20	C235409F	C1F24700	00000000	00000000	00000000
(200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(400)	00000000	00000000	00000000	00000000	43323000	4542EC00	4278A400	C0B63000	00000000	00000000
(440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(800)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(920)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1000)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1040)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1080)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1240)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

D-31944

76 DUMP OF TAPE ~~X-431~~

D-31944
AE-D

INPUT TAPE X-431 ON MS1
DATA INPUT H9 NF 341 FL 1 1 1 SR 341 1 1 SR 341 LAST 1

1/1/76 – 1/29/76

FILE 1 RECORD 1 LENGTH 4480BYTES

(0)	0000004C	00000001	00000001	00000080	00000154	00000000	000128E1	00969AB0	000128FD	02F4E988
(40)	00000000	00000000	000006A4	0000000D	00000698	000003FA	000003FB	000003FC	000003FD	000003FE
(80)	000003FF	00000400	00000401	00000402	00000403	00000404	00000405	00000406	00000407	00000408
(120)	00000409	0000040A	0000040B	0000040C	0000040D	0000040E	0000040F	00000410	00000411	00000412
(160)	00000413	00000414	00000415	00000416	00000417	00000418	00000419	0000041A	0000041B	0000041C
(200)	0000041D	0000041E	0000041F	00000420	00000421	00000422	00000423	00000424	00000425	00000426
(240)	00000427	00000428	00000429	0000042A	0000042B	0000042C	0000042D	0000042E	0000042F	00000430
(280)	00000431	00000432	00000433	00000434	00000435	00000438	00000439	0000043A	0000043B	0000043C
(320)	0000043D	0000043F	00000440	00000441	00000442	00000446	00000447	00000448	00000449	0000044A
(360)	0000044B	0000044C	0000044D	0000044E	0000044F	00000450	00000451	00000452	00000453	00000454
(400)	00000455	00000456	00000457	00000458	00000459	0000045A	0000045B	0000045C	0000045D	0000045E
(440)	0000045F	00000460	00000461	00000462	00000463	00000465	00000466	00000467	00000468	00000469
(480)	0000046A	0000046B	0000046C	0000046D	0000046E	0000046F	00000470	00000471	00000472	00000473
(520)	00000474	00000475	00000476	00000477	00000478	00000479	0000047A	0000047B	0000047C	0000047D
(560)	0000047E	0000047F	00000480	00000481	00000482	00000483	00000484	00000485	00000486	00000487
(600)	00000488	00000489	0000048A	0000048B	0000048C	0000048D	0000048E	0000048F	00000490	00000491
(640)	00000492	00000493	00000494	00000495	00000496	00000497	00000498	00000499	0000049A	0000049B
(680)	0000049C	0000049D	0000049E	0000049F	000004A0	000004A1	000004A2	000004A3	000004A4	000004A5
(720)	000004A6	000004A7	000004A8	000004A9	000004AA	000004AB	000004AC	000004AD	000004AE	000004AF
(760)	000004B0	000004B1	000004B2	000004B3	000004B4	000004B5	000004B6	000004B7	000004B8	000004B9
(800)	000004BA	000004BB	000004BC	000004BD	000004BE	000004BF	000004C0	000004C1	000004C2	000004C3
(840)	000004C4	000004C5	000004C6	000004C7	000004C8	000004C9	000004CA	000004CB	000004CC	000004CD
(880)	000004CE	000004CF	000004D0	000004D1	000004D2	000004D3	000004D4	000004D5	000004D6	000004D7
(920)	000004D8	000004D9	000004DA	000004DB	000004DC	000004DD	000004DE	000004DF	000004E0	000004E1
(960)	000004E2	000004E3	000004E4	000004E5	000004E6	000004E7	000004E8	000004E9	000004EA	000004EB
(1000)	000004ED	000004EE	000004EF	000004F0	000004F1	000004F2	000004F3	000004F4	000004F5	000004F6
(1040)	000004F7	000004F8	000004F9	000004FA	000004FB	000004FD	000004FE	000004FF	00000500	00000501
(1080)	00000502	00000503	00000504	00000505	00000506	00000507	00000508	00000509	0000050A	0000050B
(1120)	0000050C	0000050D	0000050E	0000050F	00000510	00000511	00000512	00000513	00000514	00000515
(1160)	00000516	00000517	00000518	00000519	0000051A	0000051B	0000051C	0000051D	0000051E	0000051F
(1200)	00000520	00000521	00000522	00000523	00000524	00000525	00000526	00000527	00000528	00000529
(1240)	0000052A	0000052B	0000052C	0000052D	0000052E	0000052F	00000530	00000531	00000532	00000533
(1280)	00000534	00000535	00000536	00000537	00000538	00000539	0000053A	0000053B	0000053C	0000053D
(1320)	0000053E	0000053F	00000540	00000541	00000542	00000543	00000544	00000545	00000546	00000547
(1360)	00000548	00000549	0000054A	0000054B	0000054E	0000054F	00000550	00000551	00000552	00000553
(1400)	00000554	00000555	00000556	00000557	00000559	00000000	00000000	00000000	00000000	00000000
(1440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1600)	000128E1	00000005	00000003	00000004	00000006	00000007	00000003	00000004	00000003	00000004
(1640)	0000000D	00000007	0000000A	00000011	00000014	00000007	0000000A	00000007	0000005A	424B0000
(1680)	4248199A	00000000	000128E2	00000000	00000005	00000004	00000004	00000004	00000004	00000007
(1720)	00000005	00000004	00000000	0000000D	0000000A	0000000A	0000000A	0000000A	00000014	0000000D
(1760)	00000057	424A0000	42473333	00000000	000128E3	00000007	00000007	00000009	00000009	00000016
(1800)	0000000C	0000001B	0000001B	0000000F	00000014	00000014	00000017	00000017	00000025	0000001B
(1840)	00000028	00000028	000000E6	424A0000	42474CCD	00000000	000128E4	0000000C	0000000F	0000000C
(1880)	00000005	00000009	00000009	0000000C	00000009	0000000A	0000001B	0000001E	0000001B	0000000D
(1920)	00000017	00000017	0000001B	00000017	000000C1	424A0000	4247CCCD	00000000	000128E5	00000009
(1960)	0000000F	00000009	0000000C	00000005	00000006	00000009	00000007	00000009	00000017	0000001E
(2000)	00000017	0000001B	0000000D	00000011	00000017	00000014	000000B1	424A0000	4247E666	00000000
(2040)	000128E6	00000006	0000000C	00000007	00000004	00000007	0000000F	00000016	00000020	0000000D
(2080)	00000011	0000001B	00000014	0000000A	00000014	0000001E	00000025	0000002B	000000CB	424A0000
(2120)	4247B333	00000000	000128E7	0000001B	0000000F	00000009	00000007	00000007	0000000C	00000006
(2160)	00000006	0000000B	00000028	0000001E	00000017	00000014	00000014	0000001B	00000011	00000011
(2200)	000000C1	42490000	4247999A	00000000	000128E8	00000002	00000006	00000004	00000005	00000005
(2240)	00000005	00000007	00000009	00000005	00000003	00000011	0000000A	0000000D	0000000D	0000000D
(2280)	00000014	00000017	00000071	42490000	4246E666	00000000	000128E9	00000005	00000006	00000004

(5520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5800)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5920)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6000)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6040)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6080)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
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(6360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6400)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	4272B4B2	425A0C81
(6760)	402B3564	441E8C30	C250E109	42D22FC6	C080BB3B	40D474F	BF387DD4	43AC9F83	427A21D1	43559000

FILE 341 RECORD 11 LENGTH 6656BYTES

(0)	000128FD	02F314C8	43353000	41100000	415D4EBF	40A05B87	C0B715B8	C04F61A1	451E6CF6	C554E4DC
(40)	C51CF4E5	C415FFEC	C3CCF2CF	C3A28385	C1360741	C11F528A	416E4D1C	C139DAB1	C118C05E	416E4D1C
(80)	43281640	C215E25E	C27BEC40	43277910	C216F42A	41544336	4159B464	41131E80	4217D2A1	404372DB
(120)	C0279B80	C0261CB3	4026C9EC	4085B555	C0D3DB21	40315DD8	C21F7C8C	C41385C4	C3F20EA0	43852FBE
(160)	C41418A8	C3ACC39C	C3C9B465	4212A0E3	C2745C20	C21CEE70	C27DE240	00000000	00000000	00000000
(200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(240)	00000000	3D1FA234	3C567DF7	3D2B2FC4	00000000	4084B3ED	45144C17	3E23ACC9	417BA4C8	44AD3F2E
(280)	00000000	00000000	44193051	00000000	429EC7D7	00000000	434DB06F	4418BD17	00000000	00000000
(320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(400)	00000000	00000000	468683B6	45676EF6	452A5497	44672B24	00000000	4413C71E	00000000	00000000
(440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	000128FD	02F34F60
(520)	43362000	41100000	415D533C	40A05BAF	C0B7159A	C04F6195	451E6DDF	C554E4A0	C51CF4BE	C41631D8
(560)	C3CEC1D4	C39C07A8	C1347784	C11E69CC	416F021B	C1385399	C117C8B7	416F021B	43291480	C214EB94
(600)	C27BFCA0	43285150	C2161AA1	415442E6	415986A1	4112FB02	4217585E	404252FD	C0257033	C0248728
(640)	40286EAA	407FAB84	C0D76931	403122B5	C21DEA2C	C413A68B	C3F0E18D	43828926	C41435A9	C3AD2CFE
(680)	C3C67BDC	42123E97	C274BD10	C21C6D4A	C27E0620	00000000	00000000	00000000	00000000	00000000
(720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	3D2EA15F
(760)	00000000	3D1E5955	3E176B39	411AD985	451D31BA	3E3D217A	419F81A2	44E49272	00000000	00000000
(800)	441A9878	00000000	42B29545	00000000	434A5545	44140902	00000000	00000000	00000000	00000000
(840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(920)	4670A325	45189C4F	4518EE3C	4491E9F1	44375DAD	4415776E	00000000	00000000	00000000	00000000
(960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1000)	00000000	00000000	00000000	00000000	00000000	00000000	000128FD	02F389F8	43371000	41100000
(1040)	415D57B4	40A05BD8	C0B7157C	C04F6188	451E6EC9	C554E463	C51CF498	C416624C	C3D08333	C3958170
(1080)	C132E70E	C11D80A5	416FAE96	C136CB87	C116D117	416FAE96	432A1540	C213F5E3	C27C0CD0	43292810
(1120)	C21541BE	41544299	41595960	4112DAA1	4216E588	40413DB2	C0234080	C022F212	4029F730	40797745
(1160)	C0DAE092	4030E7B6	C21C5342	C413C57F	C3EFB6A7	4380C035	C4145103	C3AD7DA4	C3C371B0	4211E287
(1200)	C2751AD0	C21BF3F6	C27E2B30	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	3D2DC471	3CF0C747	3D2B2FC4

LEE
MIMS

DES

D-31946 D-31946

AE-D

DUMP OF TAPE ~~X-428~~

INPUT TAPE X-428 ON MS1 11/1/75 - 11/30/75 12/31/75

DATA INPUT HS AF 292 FL 1 1 1 SR 292 1 1 SR 292 LAST 1

75-305

FILE 1 RECORD 1 LENGTH 4480BYTES

(0)	0000004E	0000000B	00000001	00000080	00000123	00000000	00012629	00895440	00012647	0003A980
(40)	[illegible]	[illegible]	000006A4	0000000D	00000698	00000127	00000128	00000129	0000012A	0000012B
(80)	0000012C	0000012D	0000012E	0000012F	00000130	00000131	00000132	00000133	00000134	00000135
(120)	00000136	00000137	00000138	00000139	0000013A	0000013B	0000013C	0000013D	0000013E	0000013F
(160)	00000141	00000142	00000143	00000144	00000145	00000147	00000148	00000149	0000014A	0000014B
(200)	0000014C	0000014D	0000014E	0000014F	00000150	00000151	00000152	00000153	00000154	00000155
(240)	00000156	00000157	00000158	00000159	0000015A	0000015B	0000015C	0000015D	0000015E	0000015F
(280)	00000166	00000167	00000168	00000169	0000016A	0000016C	0000016D	0000016E	0000016F	00000170
(320)	00000171	00000172	00000173	00000174	00000175	00000176	00000177	00000178	00000179	0000017A
(360)	0000017B	0000017C	0000017D	0000017E	0000017F	00000180	00000181	00000182	00000183	00000184
(400)	00000186	00000187	00000188	00000189	0000018A	0000018B	0000018C	0000018D	0000018E	0000018F
(440)	00000190	00000192	00000193	00000194	00000195	00000196	00000197	00000198	00000199	0000019A
(480)	0000019C	0000019E	0000019F	000001A0	000001A1	000001A3	000001A4	000001A6	000001A7	000001A8
(520)	000001A9	000001AA	000001AB	000001AC	000001AD	000001AE	000001AF	000001B0	000001B1	000001B2
(560)	000001B3	000001B4	000001B5	000001B7	000001B8	000001B9	000001BA	000001BB	000001BC	000001BD
(600)	000001BF	000001C0	000001C1	000001C2	000001C3	000001C4	000001C5	000001C7	000001C8	000001C9
(640)	000001CA	000001CD	000001CE	000001CF	000001D0	000001D1	000001D2	000001D3	000001D4	000001D5
(680)	000001D6	000001D7	000001D8	000001D9	000001DA	000001DB	000001DC	000001DD	000001DE	000001DF
(720)	000001E0	000001E1	000001E2	000001E3	000001E4	000001E5	000001E6	000001E7	000001E9	000001EA
(760)	000001EB	000001EC	000001ED	000001EE	000001EF	000001F0	000001F1	000001F2	000001F3	000001F4
(800)	000001F5	000001F6	000001F7	000001F8	000001F9	000001FA	000001FB	000001FC	000001FD	000001FE
(840)	000001FF	00000200	00000201	00000202	00000203	00000210	00000211	00000212	00000213	00000214
(880)	00000215	00000216	00000217	00000218	00000219	0000021A	00000232	00000233	00000234	00000235
(920)	00000236	00000237	00000238	00000239	0000023A	0000023B	0000023C	0000023D	0000023F	00000240
(960)	00000241	00000242	00000243	00000244	00000245	00000246	00000247	00000248	00000249	0000024A
(1000)	0000024B	0000024C	0000024D	0000024E	0000024F	00000250	00000251	00000252	00000253	00000254
(1040)	00000255	00000256	00000257	00000258	00000259	0000025A	0000025B	0000025C	0000025D	0000025E
(1080)	0000025F	00000260	00000261	00000262	00000263	00000264	00000265	00000266	00000267	00000268
(1120)	00000269	0000026A	0000026B	0000026C	0000026F	00000270	00000271	00000272	00000273	00000274
(1160)	00000275	00000276	00000277	00000278	00000279	0000027A	0000027B	0000027C	0000027D	0000027E
(1200)	0000027F	00000280	00000281	00000282	00000283	00000284	00000000	00000000	00000000	00000000
(1240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1400)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1560)	00000000	00000000	00000000	0000000C	00000000	00000000	00000000	00000000	00000000	00000000
(1600)	00012629	00000005	00000005	00000006	00000009	00000006	00000004	00000003	00000012	00000007
(1640)	0000000D	0000000D	00000011	00000017	00000011	0000000A	00000007	00000021	00000085	42480000
(1680)	42466666	00000000	0001262A	00000009	0000000F	00000007	00000012	00000016	0000001B	0000006F
(1720)	00000051	00000024	00000017	0000001E	00000014	00000021	00000025	00000028	00000043	0000003C
(1760)	00000136	42490000	42476666	00000000	0001262B	00000050	00000043	00000043	00000038	00000030
(1800)	00000050	00000043	00000036	00000041	0000003C	00000039	00000039	00000035	00000032	0000003C
(1840)	00000039	00000035	0000016F	424A0000	42490000	00000000	0001262C	00000038	00000038	00000030
(1880)	00000030	00000030	00000020	0000001B	0000000C	00000029	00000035	00000035	00000032	00000032
(1920)	00000032	0000002B	00000028	0000001B	0000016F	424D0000	424E6666	00000000	0001262D	00000012
(1960)	0000000C	0000000C	00000027	0000000F	00000020	0000001B	00000012	00000016	00000021	0000001B
(2000)	0000001B	0000002F	0000001E	0000002B	00000028	00000021	00000118	42500000	424EE666	00000000
(2040)	0001262F	00000012	00000012	00000006	00000009	00000012	0000000F	00000002	00000003	0000000B
(2080)	00000021	00000021	00000011	00000017	00000021	0000001E	00000003	00000007	000000B4	42520000
(2120)	4250199A	00000000	0001262F	0000000C	0000000C	00000006	0000000C	00000009	00000012	00000009
(2160)	[illegible]	0000000A	0000001E	0000001B	00000011	0000001B	00000017	00000021	00000017	0000000D
(2200)	[illegible]	4252[illegible]	425[illegible]	[illegible]	00012630	00000007	00000006	0000000C	00000007	00000004
(2240)	00000007	00000006	00000005	00000007	00000014	00000013	0000001B	00000014	00000004	00000014
(2280)	00000011	00000000	0000000F	42530000	4250E666	00000000	00012631	00000007	00000012	00000027

(5520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5800)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5920)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(5960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6000)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6040)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6080)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
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(6400)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
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(6560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
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(6640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(6720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	42798A22	425A165F
(6760)	40332639	441FBFC8	424202DA	42D1D4D0	C07F6294	40DE0F5B	BE62DE98	43D2D979	427DB241	43284000

FILE 292 RECORD 335 14 LENGTH 6656BYTES

(0)	00012647	00028488	C417EB00	00000000	41138864	C05F3B56	C0DA045E	C05E870F	C5436286	C5355F09
(40)	C518CE58	44143C92	43BA3EE6	4411E2C4	414E[illegible]E4[illegible]	412CA392	C15066EE	4151884F	41269836	C15066EE
(80)	434869D0	4225A48E	C22[illegible]09F[illegible]	C37F536[illegible]	422[illegible]4F08	42159123	42159EF7	4124F21F	4230D8B4	404896F5
(120)	C037C542	C02D09F8	BFB68543	C0DEAC50	C077EA9E	C0279DA9	423C6FF4	44111D81	43926011	44114F99
(160)	43825D49	43C94CC7	C4153F67	4229A0B1	C229D240	C2369F5F	C1CDFD00	00000000	00000000	00000000
(200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	44279021	C115DB78
(240)	41596E39	3C6AEF64	00000000	3D40C7A6	3DFF7A78	4157A4AB	446EC053	00000000	C1100000	00000000
(280)	00000000	00000000	4416AF32	00000000	4324E6ED	00000000	00000000	00000000	00000000	00000000
(320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(400)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(440)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(480)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00012647	0002BF20
(520)	C417DC00	00000000	41138CDB	C05F3B26	C0DA[illegible]47[illegible]	C05E8717	C54361E0	C5355FC6	C518CE91	44148534
(560)	438CD778	441196E9	414CE472	412BF847	C1516B1B	41506AE9	4125D739	C1516B1B	4349B690	4224CC50
(600)	C2281A60	C3801E60	421F0796	42159119	42159BCE	41241493	42303F2A	40475E55	C036FEEA	C02C8599
(640)	BF94CF1B	C0DD11A4	C07AB31C	C0261 49A	423BB7AF	4411496C	43931027	4411220F	43865A38	43CBA741
(680)	C41513F6	42291B47	C22A0270	C235FBAE	C1D6C200	00000000	00000000	00000000	00000000	00000000
(720)	00000000	00000000	00000000	00000000	00000000	00000000	442CF41B	C117F378	4154F63B	3C4BA45F
(760)	00000000	00000000	3E167C91	4171ECFC	4461CB1B	3DA3E5D0	41D19997	441CF2FB	00000000	00000000
(800)	442[illegible]E7F9	[illegible]	43275 3[illegible]E	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(840)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(880)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(920)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1000)	00000000	00000000	00000000	00000000	00000000	00000000	00012647	0002F9B8	C417CD00	00000000
(1040)	4113915[illegible]	C[illegible]5F3AF7	C0DA[illegible]481	C05E871F	C5436139	C5356[illegible]83	C518CEC9	4414CCBE	43BF65FA	44114A1D
(1080)	414BB902	412B4C12	C15268C1	414F4BB1	412515A6	C15268C1	434B0440	4223F53B	C2282AF0	C380CD40
(1120)	421DBD52	42159110	42159[illegible]C5	41234499	422FA8[illegible]	4C4527B5	C0362CF5	C02BFA1F	BF74049D	C0DB69BA
(1160)	C[illegible]767CFF	C[illegible]2[illegible]D0A	423AFD[illegible]F	441173DA	43939DF4	441CF669	438A31A5	43CDCEE0	C414E9FC	42289C64
(1200)	C22A3590	C2355FDC	C1DF3C00	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(1240)	00000000	00000000	00000000	[illegible]	442A301A	C1176F78	41516A38	00000000	00000000	00000000