#277

ALOUETTE 2

ORIG REDUCED DATA 65-098A-04A

7 TAPES

BOUNDARY DATA 65-098A-04B

1 TAPE

ALOUETTE I

COUNT RATE DATA

65-098A-04A

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY SEVEN 7-TRACK, 800 BPI TAPES. WRITTEN IN BINARY. THERE ARE TWO RESTORED TAPES. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
DR02782	DS02782	D13529	1	12/02/65 - 02/08/66
		D13528	2	02/08/66 - 05/18/66
		D13530	3	05/17/66 - 06/29/66
DR02783	DS02783	D14472	1	06/28/66 - 08/18/66
		D14473	2	08/18/66 - 12/12/66
		D14475	3	12/12/66 - 04/15/67
		D14474	4	04/02/67 - 11/08/67

REQ. AGENT	RAND NO.	ACQ. AGENT
DLB	RB5207	EGS

ALOUETTE 2

65-098A-04A

ORIG REDUCED DATA

This data set consists of 7 Alouette 2 Orig Reduced data tapes. These tapes were created on an IBM 360 at 800 BPI, binary, 9 track, 1 file. Blocks contain 50 card image records.

The time spans for the tapes are:

D#	C#	TIME SPAN	ORBITS
D-13529	C-12110	12/02/65 - 2/08/66	34- 843
D-13528	C-12109	2/08/66 - 5/18/66	851-2016
D-13530	C-12111	5/17/66 - 6/29/66	2004-2518
D-14472	C-12112	6/28/66 - 8/18/66	2506-3110
D-14473	C-12113	8/18/66 - 12/12/66	3104-4491
D-14475	C-12115	12/12/66 - 4/15/67	4486-5957
D-14474	C-12114	4/02/67 - 11/08/67	5801-8409

ANNEXE II 'CONDENSED' TAPES

1. DATA ARE IN CHRONOLOGICAL ORDER AND INCLUDE ONLY THOSE TIMES WHEN THE INVARIANT LATITUDE $\geq 50°$ ($\Delta t = 1$ sec)

2. a) TAPES ARE 9-TRACK, 800 b.p.i

   b) RECORDS ARE 80 BYTES LONG; BLOCKS CONTAIN 50 RECORD (LRECL = 80, BLKSIZE = 4000, RECFM = FB)

   c) ALL RECORDS ARE ON ONE FILE

   d) ALL RECORDS WERE WRITTEN UNDER FORMAT 20A4

3. EACH RECORD CONTAINS 20 WORDS AS FOLLOWS:

1.	STATION-ORBIT	SPPPPPP	I*4
2.	YEAR		I*4
3.	DAY		I*4
4.	HOUR		I*4
5.	MINUTE		I*4
6.	SECOND		I*4
7.	Kp		I*4
8.	ALTITUDE (km)		R*4
9.	MAGNETIC FIELD B (gauss)		R*4
10.	INVARIANT LATITUDE		R*4
11.	LOCAL MAGNETIC TIME		R*4
12.	ANGLE BETWEEN SPIN AXIS AND FIELD		R*4
13.	PITCH ANGLE OF "223 PERP" COUNTER		R*4
14.	PITCH ANGLE OF "223 PARALLEL" COUNTER		R*4
15.	"223 PERPENDICULAR" COUNTER		R*4
16.	SILICON JUNCTION "		R*4
17.	"223 PARALLEL" "		R*4
18.	302 COUNTER		R*4
19.	"223 WITH FIELD" COUNTER		R*4
20.	"Telescope"		R*4

kilometers, inclination 79.8° prograde, and period 121.4 minutes. The satellite orbit plane precesses at about 2° per day with respect to the earth–sun line, so that in a three-month period data are obtained at all local times.

The charged particle experiment on the satellite, which is similar to an experiment on Alouette I, consists of seven different particle detectors. The geometric factors and energy thresholds of five of the detectors are listed in Table I. Only detectors 1 and 4 have been used in the present study. Detector 1 is a thin-window (~1 mg/cm²) Geiger counter mounted behind a brass collimator whose axis is inclined 90° to the satellite spin axis. Detector 4 is an Eon 7302 Geiger counter whose wall thickness plus shielding is 1.4 g/cm² over approximately 2.4 steradians and much greater over the remaining solid angle.

The satellite is spin stabilized and has a spin period of 26.7 seconds; magnetic aspect is obtained from a three-component magnetometer on board. During each spin period, detector 1 samples a range of pitch angles of $90 \pm \theta$ degrees, where θ is the angle between the spin axis and the magnetic-field direction, θ being a slowly varying function of latitude and time (because the spin axis precesses). The boundary measurements reported here for 35-keV and 3.9-MeV electrons refer to local pitch angles close to 90°.

For this study, passes recorded by telemetry stations in England, Canada, and Alaska were used. Data from the telemetry tapes are first transferred to digital magnetic tapes and these are merged with world map tapes supplied by NASA in an IBM 360 computer. The computer then calculates for each second of the pass corrected counting rates, the angles between the magnetic field direction, and the counter collimator axes, local magnetic time and obtains by interpolation from the world map tape the various positional coordinates (B, L, Λ, etc.). The computer output is stored on magnetic tape and for each pass the counting rates of all the detectors, along with pitch angles and magnetic coordinates, are plotted on an EAI 3500 Data Plotter.

Results

To study the dependence of various features of the radiation zone on magnetic local time the following four high-latitude boundaries were defined: Λ_b, the 35-keV "background" boundary, is determined by the invariant latitude where the counting rate in the 35-keV electron detector falls to the cosmic-ray background level; Λ_s, the 35-keV "smooth" boundary, is determined by the latitude where the 35-keV electron profile shows a marked change in character—this may be a sudden change in slope, a rapid change in intensity, or the onset of rapid intensity variations; Λ_1, the 35-keV "sharp" boundary, is determined by the latitude where the 35-keV profile decreases in intensity by more than a factor of 10 in a latitude interval of less than

TABLE I

Alouette II detector parameters

Detector number	1	2	3	4	5
Detector type	Thin-window Geiger	Thin-window Geiger	Thin-window Geiger	Thick-wall Geiger	Solid state
Directional properties					
Angle from spin axis	90°	10°	0°	—	10°
Half-angle of view	5.2°	4.5°	13°	—	19°
Geometric factor (cm² sr)	5.6×10^{-3}	5.1×10^{-4}	1.9×10^{-2}	—	6.8×10^{-2}
Particle response (50% transmission) e⁻	>35 keV	>43 keV	>250 keV	—	1.3–7 MeV
Particle response (50% transmission) p⁺	>0.5 MeV	>0.5 MeV	>0.5 MeV	—	
Directional properties					
Geometric factor (cm²)	0.75	0.20	0.20	0.75	
Particle response (50% transmission) e⁻		>3.9 MeV	>3.9 MeV	>3.9 MeV	
Particle response (50% transmission) p⁺		>33 MeV	>33 MeV	>33 MeV	
Minimum shielding for effective solid angle	~3.1 g/cm⁻² ~4.0 sr	~1.4 g/cm⁻² ~2.0 sr	~1.4 g/cm⁻² ~0.4 sr	~1.4 g/cm⁻² ~2.4 sr	
	223 L	223 //	223 flat	302	Silicon

```
*************************************************************************
(NFILES,MODE,DENSITY,TAPE DESCRIPTION)
  1 BIN 800
*************************************************************************

*** READ ERROR ON RECORD      2  OF FILE    1

 FILE NO.    1
    3838 RECORDS                1 READ ERRORS
       2372.2 FEET OF TAPE


***  NO. OF FILES CHECKED =  1            NO. OF FEET OF TAPE = 2372.2
         TOTAL NO. OF PHYSICAL RECORDS =  3838
         TOTAL NO. OF READ ERRORS =     1
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D-13529

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00049402	00000041	00000150	00000001	0000000C	00000002	0000012C	43A87858	40359371	424FAA4F
4211C4F2	4220BECE	424B6131	422AA91F	412CF5C2	00000000	00000000	4123D70A	00000000	4068851E
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4211C6DE	4220C9C5	42527FBD	422AC10B	412FAE14	00000000	00000000	412E8F5C	00000000	40599999
00049402	00000041	00000150	00000001	0000000C	00000004	0000012C	43A88BA6	40358C72	424F9DE9
4211C8CC	4220D4D2	4259CB02	422A691C	412FAE14	4011EB85	00000000	413E147A	00000000	40599999
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4211CAB9	4220CFF6	4260F911	4229A443	412FAE14	4011EB85	00000000	41359999	00000000	41140000
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4211DFEA	4221605D	425F1251	421761B1	415547AE	4011EB85	4113AE14	4127AE14	40AB851E	401C28F5
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4211EF53	4221C47C	423554CE	4225FA21	412E3D70	4011EB85	4110F5C2	411E8F5C	40AB851E	40947AE1
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D-13529
C-12110
Orbits 34-843
12/02/65 - 02/08/66

RECORD 3836 OF FILE 1
LENGTH = 4000 BYTES

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41178BD3	4235A3A7	42575A8B	422C0FED	436BC670	4124F5C2	421FFD70	4245547A	00000000	4023D70A
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41178ED7	4235561D	424C8381	422D0618	4366DE83	411AB851	4225A147	4242A8F5	00000000	4023D70A
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4117E968	42340288	422CDFC9	4231DC3C	4351682A	40A147AE	42459999	422CCCCC	00000000	4075C28F	
0004972B	00000042	00000027	00000006	00000036	00000024	00000021	43AE4000	402F91A2	423E9EB7	
4117EC6C	4233F527	42266F1D	42342516	43248F49	40570A3D	42480000	422D9999	00000000	40B0A3D7	
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4117F276	4233DA6E	422442F0	42387698	42800000	405C28F5	42600000	42480000	00000000	40428F5C	
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4117F57B	4233CD15	42291A95	423A48A7	432C826D	40570A3D	42640000	42380000	00000000	40400000	
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4117F87F	4233BFBA	42309F43	423BC33F	435427B7	40570A3D	4252D999	42440000	00000000	40400000	
0004972B	00000042	00000027	00000006	00000036	00000029	00000021	43AE1800	402FAACF	423EC1EA	
4117FB84	42338263	4239B969	423CD595	43889022	40570A3D	426923D7	42440000	00000000	40828F5C	
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4117FE89	4233A50B	4243B2A3	423D739F	43BAD403	40570A3D	42600000	4251EB85	00000000	408F5C28	
0004972B	00000042	00000027	00000006	00000036	0000002B	00000021	43AE0800	402FB4E2	423ECFFF	
4118018E	423397B7	424E1B87	423D964D	43CC1DFE	40570A3D	4275547A	425C28F5	00000000	4028F5C2	
0004972B	00000042	00000027	00000006	00000036	0000002C	00000021	43AE0000	402FB9EA	423ED709	
41180493	4233EA62	4258A9AC	423D3BB2	43C084DC	40570A3D	427AA8F5	42400000	00000000	4028F5C2	
0004972B	00000042	00000027	00000006	00000036	0000002D	00000021	43ADF800	402FBEF4	423EDE13	
41180798	42337D10	426320C0	423C6722	43C084DC	40570A3D	42780000	4243DEB8	00000000	4028F5C2	
0004972B	00000042	00000027	00000006	00000036	0000002E	00000021	43ADF000	402FC3FC	423EE51E	
41180A9C	42336FC0	426D41B7	423B20ED	43D20FA9	40570A3D	42780000	423C0000	00000000	4028F5C2	
0004972B	00000042	00000027	00000006	00000036	0000002F	00000021	43ADE800	402FC906	423EEC27	
41180DA1	4233626D	4276BBBB	4239764C	437DE404	40400000	42600000	4248CCCC	00000000	402B851E	
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411810A6	42335521	427F1858	4237790E	437DE404	402E147A	42680000	4245DC28	00000000	402E147A	
0004972B	00000042	00000027	00000006	00000036	00000031	00000021	43ADD800	402FD318	423EFA3C	
411813AB	423347D3	4285A79C	42353F2B	43341D82	402E147A	4262A8F5	4245547A	00000000	405EB851	
0004972B	00000042	00000027	00000006	00000036	00000032	00000021	43ADD000	402FD820	423F0146	
411816AF	42333A88	4289849B	4232E28D	432B2026	402E147A	4259547A	4242A8F5	00000000	405EB851	
0004972B	00000042	00000027	00000006	00000036	00000033	00000021	43ADC800	402FDD2A	423F0851	
411819B4	42332D3D	4289E9C9	42308197	4327C883	402E147A	4256A8F5	423AA8F5	00000000	40B33333	

3836 RECORDS IN FILE 1 OF TAPE

ALOUETTE 2

PARTICLE BOUNDARY DATA

65-098A-04B

THIS DATA SET HAS BEEN RESTORED. THE ORIGINAL TAPE WAS 9-TRACK, 800 BPI, EBCDIC AND THE RESTORED TAPE IS 9-TRACK, 6250 BPI. THE TAPE WAS CREATED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBER AND THE TIME SPAN ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR02795	DS02795	D13531	1	11/29/65 - 06/18/69

REQ. AGENT	RAND NO.	ACQ. AGENT
DLB	RB5207	EGS

ALOUETTE 2

65-098A-04B

BOUNDARY DATA

This data set consists of 1 Alouette 2 Boundary data tape created on an IBM 360 at 800 BPI, EBCDIC, 9 track, 1 file.

The time span for the tape is:

D#	C#	TIME SPAN
D-13531	C-12116	11/29/65 - 6/18/69

Alouette II Boundary Listings

1. Column 1 — Station Code number

   1 Resolute
   2 Winkfield
   3 Ottawa
   5 College, Alaska
   6 Ororal, Australia
   7 Tromso, Norway
   9 University of Alaska

2. Column 7 — 'X' specifies an ascending (pole-ward) pass
   Column 8 — 'X' specifies a decending (equator-ward) pass

   The direction is determined at the beginning of a pass only i.e., if the satellite crossed either the north or south poles during a pass, the direction would be specified as "ascending".

3. Column 11 — "Phi" is the magnetic solar co-declination measured in the direction away from the sun.

4. a) The "Boundaries" heading applies to all entries from "40 B'grd" to "1-8 MeV".

   b) The "40 B'grd" boundary is defined as the point where the intensity of the 40 keV electrons reaches the cosmic ray background intensity; the invariant latitude and local magnetic time of this point are listed.

   c) The "40SB" boundary describes the point at which a special type of discontinunity occurred in the 40 keV electron counting rate and its invariant latitude was recorded for a few of the earlier Alouette II passes. However, we later discontinued the practice of recording it.

   d) For the 40 keV "smooth" boundary, the invariant latitude, local magnetic time and the log of the intensity at the boundary are recorded. For the 40 keV "sharp" boundary and the three higher energy background boundaries, only the invariant latitude

is recorded; the local time could be estimated approximately from the 40 keV "background" and 40 keV "smooth" boundary local times if it were required.

e) The 1-8 MeV counter detects particles in that energy range and does not discriminate among the different energies. At the point where the counting rate reaches its background value, the higher energy particles have disappeared and the invariant latitude recorded is essentially the background boundary for the 1 MeV particles.

5. The local magentic time, magnetic field and intensity data which are missing from the "Intensity Maximum" and "Intensity Minimum" entries were omitted either because they were of little significance (e.g. in the intensity minima, the local times and 3.9 MeV log I) or for reasons of economy. The missing magnetic fields and local times could, if necessary, be inferred with sufficient accuracy from the other values given for the pass.

6. "Col 120" is a code used in our program for producing the tapes and is of no significance to the data.

D-13531

```
$JOB  14:35:00
$ASS IN TU1
$NOP
$NOP
$NOP ****************** DOUTA ******************
$EXE TPLIST BS

INPUT PARAMETERS ARE:  ED FL=20=20 1

 TAPE NO.   1                FILE NO.   1
 RECORD   1                  LENGTH   120
 5   4865333201112 76100  3778  0694  0 92 93200  0  0  0  0  0  0654  0637248287 94624110287  0  0
596200  0  0  0  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   2                  LENGTH   120
 5   2565335064910 59233  19740  0  0  0153  0  0729683  0162179  0669654640410190183  0  0  0  0  0
  0  0  0  0  0  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   3                  LENGTH   120
 3   3565336031021 58333  9717  0674716184189270  0  0  0  0  0  0663645639390181193638120181  0  0
  0  0  0  0616  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   4                  LENGTH   120
 5   3865336091720 65233  9  0  0  0  0  0  0  0  0  0  0  0  0  0657637641400196183637126195636170
542 33602 88613  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   5                  LENGTH   120
 5   4865337052520 57  0  2  0  0693  0  0175270  0  0  0  0  0  0684  0  0  0184  0  0  0  0  0  0
  0  0  0  0  0  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   6                  LENGTH   120
 2   5565337193920 76 33  2724  0698702208208260  0  0  0  0  0713692637639380173207635135172636196
596210610119609  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   7                  LENGTH   120
 5   7865339175312 79 33  3761  0720  0 85 85140  0  0  0  0  0  0691631662330275 85638 80277  0  0
596180598  4  0  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   8                  LENGTH   120
 5   8465340061722 57 67  3  0  0708  0148164140  0  0  0  0  0  0677644649370185176632110180634140
600195606100607  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   9                  LENGTH   120
 2  10165341165320 79  0  3  0  0  0  0202202  0  0  0  0  0  0  0  0  0646325178202  0  0176  0  0
600165  0  0  0  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   10                 LENGTH   120
 5  10365341203110 74  0  3729  0686  0 86 86150  0  0  0  0  0  0693630655310246 86636 95247  0  0
598160598  0607  0  0

 TAPE NO.   1                FILE NO.   1
 RECORD   11                 LENGTH   120
 5  11565342205012 73200  4753  0680  0 86 86280  0  0  0  0  0  0689634656320241 86634105242  0  0
602180597  0615  0  0
```