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ENVIRONMENTAL MEASUREMENTS FOR MAGAT, BLM, AND STREX. INSTRUMENT--ETC(U)
FEB 81 C W FAIRALL, D E SPIEL N00014-78-C-0204
BOM/M-TR-0003-81 NL
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6 ENVIRONMENTAL MEASUREMENTS FOR
MAGAT, BLM, AND STREX
INSTRUMENTATION AND DATA ACQUISITION PROGRAMS,
by
C. W. FAIRALL AND D. E. SPIEL
NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA 93940

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FOREWORD

This report was prepared under Work Order Nos. 422, 302 and 315 of Contract Nos. N00014-78-C-0204 and N00014-79-C-0088, in support of the U.S. Naval Postgraduate School research project supported by the Naval Air Systems Command (Air 370) and the Naval Material Command (EO/MET). The work was performed in support of the Environmental Physics Group at NPS under the direction of Professors G. E. Schacher and K. L. Davidson.

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TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	iii
TABLE OF CONTENTS	v
ABSTRACT	vii
A. INTRODUCTION	1
B. INSTRUMENTATION	1
1. Shipboard	1
2. Aircraft	2
C. DATA ACQUISITION PROGRAMS	5
1. Ship	5
a. BLM-MET	5
b. MET-AER STREX	17
c. AEROSOL 9835	27
2. Aircraft	40
a. MET 9835	41
b. AEROSOL 9825	47

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ABSTRACT

Instrumentation and calibration of certain systems used on aircraft and ships for atmospheric research at NPS are described. Computer programs for acquisition and analysis of aerosol and micrometeorological data are included.

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A. INTRODUCTION

The Environmental Physics Group (EPG) at the Naval Postgraduate School (NPS) has participated in several field experiments in FY 80-81: the Marine Aerosol Generation and Transport Experiment (MAGAT), the Bureau of Land Management (BLM) tracer experiment and the Storm Transfer and Response Experiment (STREX). BDM personnel provided support to these efforts in the realm of instrumentation, calibration, data acquisition interfacing and programming, analysis and in-situ field participation. The purpose of this report is to document some of the instrumentation description, development and the data acquisition programming.

There are two experimental platforms (ship and aircraft), two types of data acquisition computers (HP9825-HPL and HP9835-BASIC) and two types of data (meteorological and aerosol). Because of various considerations, there are several combinations of these factors. For example, for MAGAT the ship used the HP9825 for meteorological data and the HP9835 for aerosol data while the aircraft used the reverse. For STREX a single HP9825 was used to obtain both types of data.

The instrumentation is described in Section B-1 and the programs are given in Section B-2.

B. INSTRUMENTATION

1. Shipboard Instrumentation

Most of the equipment used on board ship has been described previously (Houlihan, et al., NPS Report No. 61-78-001, 1978), so this part of the report will deal only with the ship roll-rate and heading sensors recently installed by BDM.

Ship Heading: On the RV/ACANIA a Librascope 7070 analog-to-digital converter has been connected to the gyroscope used for ship navigation. The converter is a mechanical device that senses the readout angular orientation. A buffer interfaces the serial output of the converter to a 16-bit interface to the computer.

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Ship and Roll Rate: A mechanical pendulum geared to a potentiometer, placed on and pivoting about the roll axis of the ship, provides an analog signal proportional to the ship's roll angle. A simple RC network is used to differentiate this signal to yield an output related to roll rate. The rate of roll is useful, for example, in compensating for the effect of roll on the measurement of the standard deviation in wind direction. Errors introduced by vertical and lateral accelerations of the ship are minimized by placing the pendulum on the roll axis and midway along the length of the ship.

2. Aircraft Equipment

The aircraft is operated by Airborne Research Associates of Boston, Massachusetts. The turbulence equipment was installed by NPS, the remainder belongs to Airborne Research Associates. Most of the aircraft equipment is the same as on the ship. Besides the meteorological parameters, the aircraft also carries equipment for atmospheric electricity measurements, electric field and conductivity. This equipment will not be described here. For the equipment listed below most of the needed detail can be found in the shipboard system descriptions. The following will describe important differences and equipment that is unique to the aircraft. Equipment that is identical to shipboard will not be described.

Temperature and Wind Speed Fluctuations: Both utilize $4.5 \mu\text{m}$ tungsten wires rather than the platinum wire and films used on the ship. The wires are needed rather than the films because vortex shedding from the sensors distorted the signals at aircraft air speeds. The tungsten wires are much sturdier than the platinum wires which break frequently during aircraft operation.

Temperature fluctuations are measured with TSI Model 1044 DC bridges. When the turbulence sensors were first installed on the aircraft, excessive noise was encountered due to acoustic noise from the propeller. Three foot extensions were placed on each wing tip and the probes placed on the ends of the extensions. The increased distance from the prop (18 feet) solved the problem. The temperature fluctuation probes are separated by a vertical distance of .8 m for spatial filtering. The noise level of this system is about 3 mK rms.

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.. Sea Surface Temperature: The radiometer is a PRT-5 as is on the ship, but its interpretation is slightly different. When the aircraft is low, (10 feet above the sea surface is one of the heights used) reflected radiation from the airframe is significant. This always raises the recorded temperature slightly and a correction must be applied.

.. Wind Speed and Direction: The relative air speed is determined by a MKS, Inc. capacitive differential pressure transducer, Model 223A. The aircraft normally flies with the average relative wind directly on the nose. The aircraft true ground speed and direction is determined with a Teledyne 711 Loran C navigation system. True wind speed and direction are calculated by the onboard computer. The air speed is accurate to 0.5 m/sec, the true wind speed accuracy depends on the averaging time but is about 1.0 m/sec for a two-minute run.

.. Air Temperature: Rosemount total temperature aircraft probe in a 102E housing. The probe is mounted in the window on the left side of the aircraft.

.. Dew Point: EG&G Model 137 aircraft system. The cooled mirror principle is used (similar to the ship system but specifically designed for aircraft use).

.. Altitude: Altitude is determined by sensing the pressure with a solid state device and also by radar altimeter. The pressure sensor is a National Semiconductor Type LX1702AN.

.. Microwave Refractive Index: Airborn microwave cavity refractometer supplied by the Naval Air Center (Indianapolis).

.. Aerosol Spectrum: Particle Measurement Systems, Inc. (PMS) type ASSAP aerosol spectrometer with PDS-200 controller. This unit was on loan from NOSC. Particles measured in four ranges of 15 bins each from 0.4 to 15 μ m radius.

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C. DATA ACQUISITION PROGRAMS

1. Ship

a. BLM-METEOROLOGY

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0:  " 1 121233 1/3/31":
1:  set "1",7017;do 7[30],v$[9],2[8],AS[27,4],P$[2,360]
2:  do 1[2,9],AS[2,19],0,C[3],X[3,1],1[3,2],X[3,5],2[2],P[3,10],P[10],0[5]
3:  do 1[3,9],L[5,4],K[3,9],S[3],1[3,9],Y[3],C[5,2],CS[10],0[1],3]
4:  set 1;trk 9;1dk 1;7+2[1];20,5+2[2]
5:  for i=1 to 3;for j=1 to 9;16(1-1)+1+X[I,J]+L[I,J];next j;next i
6:  for i=7 to 9;40+K[3,J]+L[3,J];next j;40+K[2,3]+L[2,2]+K[1,7]+L[1,7]
7:  100,14+0[1];100,1+0[2];100,12+0[3];100,3+0[4];100,31+0[5]
8:  "v1"→v[1];"<v1>"→AS[2];"2T"→AS[3];"21"→AS[4];"v15"→AS[5]
9:  "1"→AS[6];"T"→AS[8];"v1"→AS[9];"v2"→AS[10]
10:  "<v2>"→AS[11];"C2"→AS[13];"3/T"→AS[14];"30"→AS[15]
11:  "J"→AS[16];"P30"→AS[17];"<0>"→AS[18];"T01"→AS[19];"P02"→AS[20]
12:  "T1"→AS[21];"T2"→AS[22];"T5"→AS[23]
13:  2+K[3,1];40+K[3,5];for i=1 to 2;5+X[1,4];70+X[1,5];next i
14:  "P030":ent "P03 123 TAP0?(yes)",0$;if 0$?"yes";jto 2
15:  ent "P03 123 TAP0 NO. 10 35 123456",Y[3];ell "mark";jto 7
16:  for "ENTER DATA TAP0(cont)";sto
17:  trk 0;1af 0,Y[*];if Y[1]<50;jto 4
18:  trk 1;11f 0,Y[*];if Y[1]<60;jto 3
19:  for "ENTER FULL-SCALE TAP0.(cont)";sto
20:  qto "TAP0"
21:  1x1 0;for "P03",Y[3],Y[2],",",to P FILE",Y[1]+1;sto
22:  ent "Enter delimiters(a,b, or tabcode)",15
23:  if 15="t";ell "P03Data";jto 1
24:  if 15="n";jto 3
25:  if 15="v";jto -3
26:  1x3 1;ell "CF";ell 'ensilon';ell 'temp';ell 'size';ell 'Ctg'
27:  1x3 2;"0$;ent "Remove sensor",0$;if 0$="y";ell 'remove'
28:  ** READ IF DATA **
29:  "time":ent "Start time?(min.)",P;ent "ave. interval?",0
30:  1x3 0;1sp "Waiting for P=",P
31:  1x3 2x,c10;red 709,P5[1];if 1$1;cf;1;qto "tire"
32:  if vel(1$[1,7,8])#2;jto -1
33:  "recc":a[1]+c1;ina 0,1,C,E,P,1,0,2,0,0;0+X+P;1+J;rl+P[1]

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34: cll 2x,c10;red 709,TS[1]
35: vel(P5[1,5,6])+val(P5[1,7,8])/50+vel(P5[1,9,10])/3500+V
36: cll 'LORAI';P[7]→P[5];P[8]→P[6];cll 'DIR';cll 'AVEDESS'(O,P[2],P[3])
37: "cycle":if P=30;cll 'short';ina 0;0→P
38: P+1→P;fnt c24;wrt 709,"VR3/AV0/05VR1V30V/0V14V20"
39: dco "print in", (P+J-val(T3[2,7,8])) add60,"minutes,"ave=","X
40: for i=1 to 2;for i=1 to 9;if L[1,i]>39;goto "no i"
41: fnt 0;"AI"qstr(L[1,i])→VS
42: wrt 709,VS;fnt f;red 709,3;Z+R[1,i]→R[1,i];1+R[1,i]→U[1,i],H
43: if U=1 and G=6;Z+Q[4]→Q[4];jmo 3
44: if P=2 and G=1;Z+Q[5]→Q[5];jmo 2
45: if N=2 and G=6;Z+Q[7]→Q[7]
46: if P=2;Z+Q[4+2,1]→Q[4+2,1];1+Q[4+2,1]→C[1,2]
47: if 1=4;Z+Q[1,1]→Q[4,1];1+Q[4,2]→C[1,2]
48: if U=2 or P<4 or T>6;goto "no i"
49: Z+J[1,1-3];1+U[1,1-3]→U[1,1,N-3];if N=6;Z+1[5,1]→C[1,2];1+2[1,2]→C[5,2]
50: "no i":next i;next i;fnt c9;wrt 709,"VR1/AV1V23"
51: fnt 0;for i=1 to 5;if L[3,i]>39;jmo 5
52: fnt f3,0;wrt 700,G[3,i]-10;wait 5;"V2"qstr(G[2,1])→V[1,1]→V[1,1]
53: fnt f;red 709,2;1600Z→Z;Z+R[3,i]→R[3,i];1+R[3,i]→U[3,i]
54: if P=2;Z+Q[3]→Q[3];jmo 3
55: if P=1;Z+Q[2]→Q[2];jmo 2
56: if P=5;Z+Q[1]→Q[1]
57: next i;wrt 700,"C";1+R→X;1+U→J;if J<11;i→3
58: 1+J;1+P[4]→P[4];cll 'DIR';cll 'AVEDESS'(O,P[2],P[3]);jmo "over"
59: if X=650;2;jmo 4
60: if X<50;jmo 3
61: cll 'LORAI'
62: cll 'ROJAY'(P[5],90-P[6],P[7],90-P[8])
63: "** FLANS and TIMECHECK **":
64: if f171;cfq 1;jto "time"
65: if f1q2;cfq 2;cll 'lovsen'
66: if f1q3;cfq 3;cll 'temp'
67: if f1q5;cfq 5;cll 'ensilon'
68: if f175;cfq 6;cll 'shin'
69: if f170;cfq 9;fnt "SHRDR SPAPDS"
70: if f1j10;jmo 3

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71: if flgl;cfq 11;goto "beats"
72: call "tirccheck"(r+0,j);if not flrl2;goto "cycle"
73: cfq 12
74: dso "FLAS 11 FOR 2i";for i=1 to 20;beep;wait 1000;if flgl1;jmp 2
75: next i;-1+1[1,8];goto "calculate"
76: ent "INPUT INVERSION HEIGHT IN HERFS",H[1,8];cfq 11
77: goto "calculate"
78: "tirccheck":fnt 2x,cl0;rel 703,F3[2];val(F3[2,7,8])→r1
79: if r1>=olmod60 and int(pl/60)=9;sfq 12;ret
80: if r1<olmod60;ret
81: if int(ol/60)>0 and abs(r1-olmod60)<=int(ol/2);sfq 12
82: ret
83: "** ACTIVATE OR DEACTIVATE **":
84: "levcon":ent "Activate(a),Deactivate(d)or(f)",05;if 05="f";ret
85: if 05#"a" and 05#"d";beep;jmp -1
86: ent "Sensor Name(see list)",35;if 05="f";jmp -2
87: for i=1 to 3;for j=1 to 9;if 05=AS[0(i-1)+1];jmp 2
88: next i;next j;beep;jmp -2
89: if 05="a";41→L[N,0];jmp -3
90: 41→L[1,0];jmp -4
91: "SENSOR STATUS":prt "SENSOR STATUS";prt T3[2];prt "DEACTIVATED"
92: for i=1 to 3;for j=1 to 9;if L[i,j]>40;prt AS[0(i-1)+1]
93: next i;next j;ret
94: "** CALIBRATION **":
95: "ersilon":for i=1 to 2;X[1,1]→r1;0→r2;iso "LEVEL",1,"Vot2",r1
96: ent "",X[1,1];if X[1,1]#r1;2→r2
97: X[1,2]→r1;iso "LEVEL",1,"3",r1;ent "",X[1,2];if X[1,2]#r1;2→r2
98: X[1,3]→r1;iso "LEVEL",1,"CALIB(cosln)",r1;ent "",X[1,3];if X[1,3]#r1;2→r2
99: if r2>1;0→N[0,1]→R[N,1]
100: next j;ret
101: "Ship":P[1]→r1;iso "SHIP'S SPEED(Kts)",r1;ent "",P[1];if P[1]=r1;ret
102: 0→P[2,0]→J[2,6];for P=1 to 2
103: 0→J[P,1]→R[P,1]→J[P,4]→R[P,4];next P;ret
104: "temp":csp "Pt TEMP LEVEL 1",0[1];ent "",0[1];dso "Pt TEMP LEVEL 2",0[2]
105: ent "",0[2];iso "Pt TEMP SPEED",0[3];ent "",0[3];ret
106: "RecalDate":trk Y[2];11f 9,X[*]
107: 10f Y[1],FS,L[*],FS,0,S[*],...[*],X[*],Z[*],T[*],F[*],D[*],N[*],E[*]

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109: ret
110: ** CALC LET PARALLEL3ES **
111: "calculate": for i=1 to 3; for j=1 to 3; if L[i,j]>39; 0+R[j,i]; jmp 2
112: c[i,j]/R[i,j]+R[j,i]
113: next j; next i
114: J00R[2,5] mod 360+ i[1,7]; i[1,7] mod 360+ i[1,7]+v
115: if R[2,4]=0; 10R[1,4]+v; jmp 2
116: 10R[2,4]+v
117: det; v/(v+2+p[1]+2-2v*p[1]*cos(R))+r1;.514r1+i[3,7]; v sin(R)/r1+5
118: (-p[1]+v cos(R))/r1+0; if 0>0; asn(S)+i[2,7]; jmp 3
119: if 3>0; acs(O)+i[2,7]; jmp 2
120: 100-asn(S)+i[2,7]
121: (i[2,7]+p[2]) mod 360+ i[2,7]
122: .00385+r1; (p[3,5]-u[3])/r10[3]+i[1,6]
123: for i=3 to 4; if L[3,i]>39; jmp 2
124: (R[3,i]-R[i-2])/r10[i-2]+i[i-2,2]
125: next i; .003891+r1; for i=1 to 2; if L[3,i]>39; jmp 2
126: (R[3,i]-u[i+3])/r15[i+3]+i[i,1]
127: next i; 10(R[i,6]-1)+i[3,8]; if R[i,5]<.01; jmp 2
128: 396.2/R[i,5]+i[2,8]
129: cll 'vercal'; if L[3,5]>39; jmp 2
130: 273.15+i[1,6]+y; cll 'Q'; 0+1[3,3]
131: for i=1 to 2; if L[3,i]>39; jmp 3
132: 273.15+i[i,1]+y; cll 'O'; 0+4[i,3]
133: 273.15+i[N,2]+y; cll 'Q'; 100H[N,3]/O+H[N,4]
134: next N; jmp 2
135: "Q": .525*10+(23.84-2948/Y-5.031og(Y))+0; ret
136: if L[1,3]<40; (20.7R[1,3]/W[1,1]W[1,2]) *2+M[2,6]
137: for N=1 to 2; if L[N,1]>39; jmp 3
138: 618(5.14R[N,4])+.5*(R[N,1]R[N,2]/X[N,2]X[N,3]) *3+Q
139: Q/(X[N,4])+(-.5667)-X[N,5]+(-.6667)+1.5+4[i,5]
140: next i; if L[1,9]>39 or L[1,8]>39; jmp 5
141: 9.08(5.14P[2,4])+(-.6667)/(X[3,4])+(-.6667)-X[3,5]+(-.6667)+v
142: P[2,9]*X[3,3]/4.35+2
143: .0036*20*W[3,1]W[3,2]+y; if i[2,3]#0;.78*R[2,9]X[3,3]*X[3,2]/i[2,3]+2
144: v(i[1,9]/E)+2+i[1,9]; v(F[1,8]/Y)+2+1[2,9]; 10v*R[2,3]/(Y*Z)+i[3,9]
145: 9.5*10+(-7)(E[2,6]+.1131[3,9]+.00321[1,9])+.5+1[3,6]

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1143:  ** PRINT OUT **
1146:  "print":fmt c16,f5x,z;wrt "p","Date ":"&P3[2,1,2]&"/"&P3[2,3,4]&"/&P3[2,5,6]&";wrt "p","Time#:",Y[3],"Track#:",Y[2]
1147:  fmt c6,f3.0,4x,c7,f3.0,z;wrt "p","Time#:",Y[3],"Track#:",Y[2]
1148:  fmt 4x,c6,f4.0;wrt "p","File#:",Y[1]+1
1149:  fmt 1,c17,4x,c16,f4.0,z
1150:  wrt "p.1","End time: "&P3[2,5,6]&";"&P3[2,7,3],"Averaging time:","J
1151:  fmt c3,4x,c17,f4.0,10x,c5;wrt "p","minutes","Number averages:","X","ZLI"
1152:  fmt c17,f10.4,c15,f10.4,c14,z
1153:  wrt "p","Initial position:",P[5],"Der Longitude",P[6],"Der Latitude"
1154:  fmt 87x,c18;wrt "p","Channel assignment"
1155:  fmt 11x,c5,16x,c9,11x,c14,z;wrt "p","Ship","True Wind","Relative Wind"
1156:  wrt "p","13;cll 'space'(7)
1157:  for i=1 to 3;for j=1 to 13;wrt "p",95;next j;cll 'space'(10);next i
1158:  /,74x,c6,f5.0,z;wrt "p",L[1,1],L[1,2],L[1,3],L[1,4],L[1,5],L[1,6]
1159:  fmt 3f5.0;wrt "p",L[1,7],L[1,3],L[1,9]
1160:  fmt 4x,c11,f5.1,7x,c11,f5.1,7x,c11,f5.1,z;M[3,7]/.514+P
1161:  wrt "p","Speed(kts):",P[1],"Speed(kts):",3,"Speed(kts):",10R[2,4]
1162:  fmt 4x,c6,f5.0,z;wrt "p",L[2,1],L[2,2],L[2,3],L[2,4],L[2,5],L[2,6]
1163:  fmt 3f5.0;wrt "p",L[2,7],L[2,8],L[2,9]
1164:  fmt 7x,c3,f5.0,10x,c3,f5.0,10x,c8,f5.0,z
1165:  wrt "p","heading:",P[2],"heading:",M[2,7],"heading:",M[1,7]
1166:  fmt 8x,c6,f5.0,z;wrt "p",L[3,1],L[3,2],L[3,3],L[3,4],L[3,5],L[3,6]
1167:  fmt 3f5.0,z;wrt "p",L[3,7],L[3,8],L[3,9]
1168:  fmt 40x,c12,;wrt "p","RAV VOLTAGES"
1169:  fmt 1,4x,c5,4x,c4,5x,c3,3x,c7,2x,c10,3x,c8,z
1170:  wrt "p.1","Level","Cups","velocity","delta T","Hot film","Humidity"
1171:  fmt 2x,c11,4x,c6;wrt "p","Temperature","SigmaV"
1172:  fmt 6x,c5,c6,f5x,c3,8x,c3,7x,c6,f5x,c4,7x,c4,z
1173:  wrt "p","ave. U","RMS","ave. V","Chms","Chms"
1174:  fmt 25x,c7,13x,c5,z;wrt "p","miscel.","lynan"
1175:  wrt "p",13;for i=1 to 84;wrt "p",95;next i;fmt /;wrt "p"
1176:  fmt 63x,c3,f3.3,3x,c2,f7.3,6x,c6,f3.0,6x,c5,f3.3
1177:  wrt "p","Ts:",R[3,5],"WD",E[5,1]/E[5,3],"%i(τ):",Y[1,8],"Qrms:",R[1,9]
1178:  fmt 3,3x,c2,f7.3,7x,c5,f3.2,6x,c5,f3.3
1179:  fmt 1,2x,f5.0,f10.2,f11.3,z;for i=1 to 2
1180:  wrt "p.1",1,R[1,4],R[1,1]
1181:  if L[1,3]<41;cll 'up';imo 2

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THE BDM CORPORATION

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132: cll 'space'(12)
133: fct fl1.2,z;wrt "p",R[1,2];if L[3,3]<41;cll 'p';jmo 2
134: cll 'space'(11)
135: fct fl2.3,z;wrt "p",R[3,3+2]
136: if i=1;wrt "p.3", " ",E[5,2]/E[5,3], " 3D:",R[2,6], "Qave:",R[2,9]
137: if i=2;wrt "p.3", "02",100E[2,1]/E[2,3], " Vis:",R[1,5], "Trms:",R[1,8]
138: next i;fct fl7x,c2,f7.3,7x,c5,f3.2,5x,c5,f8.3
139: wrt "p", " ",E[2,2]/E[2,3], " 12:",R[1,6], " T0:",P[2,6]
140: if L[1,4]<40;if L[1,3]<40;lor[2,3]/R[1,9]R[1,3]+r1
141: fct fl7x,c1,f7.3,27x,c4,f8.3,2;wrt "p", "1",E[5,3], "Rtr:",r1;jmo 3
142: "CP":fct fl1.3,1x,z;wrt "p",R[1,3];ret
143: "P":fct fl1.2,z;wrt "p",R[3,1];ret
144: fct fl3.4,z;wrt "p", "MICROMET DATA"
145: fct fl5,c5,3x,c1,8x,c2,9x,c1,8x,c2,3x,c1,6x,c7,9x,c4,7x,c6
146: wrt "p", "Level", "Z", "P", "T", "R", "Q", "epsilon", "Ct+2", " Sigma"
147: fct fl5,c1,10x,c3,6x,c3,6x,c3,5x,c5,6x,c3,4x,c7,2x,c11,3x,z
148: wrt "p", "3", " (m)", " (C)", " (q/K3)", " (8)", " (m/sec)", " (m+2/sec+3)"
149: fct cll,z;wrt "p", " (C+2/P+2/3)":fct flx,c3,z;wrt "p", "Ct+ Data"
150: wrt "p", "13;for i=1 to 103;vth "p", 95;next i;fct /;wrt "p"
151: fct cll,f10.1,11x,f10.2,z;wrt "p", "Surface", 0, 11, 61
152: if i[1,6]=0;0+1[3,3];cll 'space'(11);fct fl1.1,z;wrt "p", 19.0;jmo 2
153: fct fl10.2,1x,f9.1,z;wrt "p", 3[3,3], 99.9
154: fct fl3x,c2,f7.2,6x,c5,e10.2;wrt "p", "3D", 511, "Ct+2:", 1[1,9]
155: fct fl1,f7.0,3x,f10.1,1x,z;fct 2,4e10.2,f3.1,e14.2,z
156: fct fl3,10x,f10.2,20x,f3.1,e14.2,z;fct 1,e14.2,3x,c2,f7.2,5x,c5,e10.2
157: fct fl5,15x,c3,f7.2,6x,c5,e10.2
158: for i=1 to 2;wrt "p.1", 0, 2[1]
159: if L[3,1]>39;wrt "p.3", 1[1,2], 5, 11f[1,4], 5[1,5];jmo 2
160: wrt "p.2", 4[1,1], 4[4,2], 4[1,3], 4[1,4], 5, 11f[1,4], 5[1,5]
161: if i=1;wrt "p.1", 4[2,6], 0[1], 5[2], "Ct+2:", 1[2,3];jmo 3
162: if i=2;wrt "p.5", "02", 5[3], "Ct+2:", 1[3,3];jmo 2
163: fct fl10x,c3,e10.2;wrt "p", "Cn:", 1[3,3]
164: next i
165: "** CALC & PRT SCALE **":
166: fct 3/,40x,c13;/;wrt "p", "SCALE13 PARAMETERS"
167: fct fl5,c6,3x,c3,6x,c2,3x,c2,3x,c2,3x,c2,7x,c3,7x,c2,3x,c2,11x,c1
168: wrt "p", "Method", "2/L", "Pi", "U", "T", "Q", "W", "H", "E"

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THE BDM CORPORATION

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219: fnt 37x,c7,3x,c7,3x,c6,22x,c7,16x,c5,z
220: wrt "a","(pi/sec)","(cent.)","(g/s)","(a/sec)","(rin)"
221: wrt "p",13;for i=1 to 115;wrt "e",95;next i;fnt /;wrt "p"
222: fnt 1,c10,2e11,2,5e10,3,3;fnt e2,e10,2,1x,c10,3,3x,e3,0
223: "EULA":.93;113,71;v;11 113,11>39;1(2,3)+v;jno 3
224: if 113,21>39;1(1,3)+v;jno 2
225: 1(12,3)+1(1,3)/2+1
226: if 113,31>39;1(2,2)+v;jno 3
227: if 113,41>39;1(1,2)+v;jno 2
228: 1(1,2)+1(2,2)/2+1
229: if v<2.2;.001*1.93*v*(-.15)+r1;jno 4
230: if v<5;.001*(.77+.135*v)+r1;jno 3
231: if v<8;.001*(.37+.137*v)+r1;jno 2
232: .001*(1.2+.25*v)+r1
233: .33/r1+.5+7.55*1.53/.0013+.5+r2
234: .33*.33/232*.0013+.5/r1+
235: 19*x*(.5-1(1,1)+.1+.0013*(.5+273.15)*(1-1(3,3)))/v^2+.7+x
236: r1;c11 "psi"(x);c11 "psi"(x)
237: (1-1/3)+2/(1-v/r2)*x;fnt 3;fnt 4,x,x,2
238: if 113(x-v)>.0013*x(3);x+8;jno -2
239: x+3+r1,1;c11 "psi"(x);.35/.5*v/(1-1/3)+r1,31
240: c11 "psi"(x);.35*1.35/r2*(.5-1(1,1)+.1)/(1-v/r2)+r1,41
241: .35*1.35/r2*(.5-1(3,3))/(1-v/r2)+r1,51;c11 "psi"(x);x+r1,21
242: c11 "ceiling"(1)
243: wrt "p.1","euler",r1,11,r1,21,r1,31,r1,41,r1,51,r1,61,r1,71
244: fnt 2,e3,1,e1+.2,e10,1;wrt "e.2",r1,31,r1,91,r1,101
245: "FOR EULER":10/4+2/8+1+2+3+4+5+6+7;for i=1 to 2
246: if 1(1,51)>0;c11 "e.0"(2(1,51)/2)+(.33*1.35*2(1,51)/2)+.333+3+3;0+1+0
247: next i;fnt 5(2,61)+0;c11 "e.1"(2(1,51)/2)+(1(2,61)*2(1,51)+.567/P)+.5+Y+Y;X+1+X
248: if 2=0;0+r[3,3];jno 2
249: 1/5+r[3,3]
250: if x=0;0+r[3,4];jno 2
251: (x/A)*sin(r[1,4])+1(3,4)
252: if 1(1,4)=0;0+r[3,5];jno 2
253: c11 "e.1"(2(1,51)/2)+sin(r[1,51])*(1(1,51)*2(1,51)+.567/P)+.5/1.3+T[3,5]
254: if 2(3,3)=0;0+r[3,1]+r[3,2];jno 2
255: 1(1,3)(r[3,1]+2(1,51)/r[3,3])^2+r[3,1];c11 "psi"(r[3,1]);P+r[3,2]

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256: cll 'accelin'(3)
257: wrt "a.1","Pare",f[3,1],f[3,2],f[3,3],f[3,4],f[3,5],f[3,6],f[3,7]
258: wrt "a.2",f[3,8],f[3,9],f[3,10]
259: ***HISC FRT**
260: fct 3/.498,c22,/,wrt "a", "CALIBRATION PARAMETERS"
261: fct 23x,c7,33x,c2,13x,cll;wrt "p","Epsilon","Ct","Temperature"
262: fct 10x,c4,7x,cl,3x,cl,7x,c2,6x,c2,11x,cl,8x,cl,14x,c2,12x,c7,x
263: wrt "p","Cor 2",/,wrt "a","Fu","E","S","SO","Hiscel."
264: wrt "p",13;for i=1 to 92;wth "p",95;next i;fct /;wrt "a"
265: fct 10x,c5,f3,1,f9,0,2f3,0,5x,f3,1,f9,0,2x,c7,f3,4,z
266: wrt "p","Lycan",x[3,2],x[3,3],x[3,4],x[3,5],x[3,1],w[3,2], "Surf. ",D[3]
267: fct 5,3x,c4,f7,0,1x,c3;wrt "a.5", "Si:",f[1,3], "(m)"
268: wrt "p",10;fct 2x,f3,0,f3,1,4x,f3,1,f9,0,2f3,0,5x,f3,1,f9,0,7x,f10,4,z
269: for i=1 to 2
270: wrt "p",1,x[1,1],x[1,2],x[1,3],x[1,4],x[1,5],w[1,1],w[1,2],D[M]
271: if i=1;wrt "a.5","vis:",w[2,3], "(a)"
272: if i=2;fct ex,c4,f9,2,1x,c3;wrt "p", "IR:",i[3,3], "(C)"
273: next i;0+r2;p[4]+r3;for i=1 to r3;itf (PS[2,2]-1,21)+r1
274: r1-r2+r4;abs(r4)+r5;if r5>180;(r4/r5)(r5-360)+r6;(r6/M+r2)mod360+r2;jao 2
275: r2+r4/i+r2
276: next i;0+r4;for i=1 to r3;abs(itf (PS[2,2]-1,21))-r2)+r1
277: if r1>180;r1-180+r1
278: r4+r1+2+r4;next i;7/(r4/(r3-1))+r1
279: fct 2/.cl3,f7,2,cl5,f4,1,cl6,f6,1,z
280: wrt "p","Cor sig(wd) =",r1,"Loran speed =",p[9], "Loran course =",p[10]
281: fct 10x,cl3,f3,3;wrt "p","Standard R =",r[3,6]
282: if r193;fct /,cll;wrt "p","40P ON PAPE";qto "increment"
283: ***CAPE **
284: "tape":trk y[2];ldf 0,y[*];y[1]+1+y[1];rcf 0,y[*];y[1]+w
285: rcf 1,PS,L[*],TS,U,S[*],R[*],w[*],x[*],z[*],T[*],p[*],D[*],E[*]
286: if y[1]<50;rew;jao 3
287: if y[2]=0;rew;1+y[2];trk 1;0+y[1];jao 2
288: dsp "TAPE",y[3], "IS FULL.";for i=1 to 20;beep;wait 500;next i;qto "START"
289: "increment":wth "a",12
290: if fl910;cf9 10;fxd 3;cll 'timecheck'(T+U-5,J);if not fl912;qto "meas"
291: (T+U)mod360+T;fxd 0;qto "meas"
292: *** OFFPEUP JJ55 ***

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293: "space": if r1<0; jmp 2
294: vtr "r", 32; jmp 2((r1-1+r1)=0)
295: vtr "r", 3; if (r1+r1)=0
296: ret
297: "f1a 0": if r1<0; (1-15r1)*(-.25)+0; ret
298: f1a.7r1+0; ret
299: "f1": if r1<0; 4.0(1-7r1)*(-.567)+p; ret
300: 4.0(1+2.4r1+.667)+p; ret
301: "e 0": if r1<0; (1+.5aas(r1)+.667)*1.5+p; ret
302: (1+2.5r1+.6)+1.5+p; ret
303: "psi1": if r1>0; -4.7*r1+0; ret
304: (1-15r1)*.25+p2
305: 2*ln((1+p2)/2)+ln((1+p2+2)/2)-2*atn(p2)+1.04+0; ret
306: "psi1": if r1>0; -6.5*r1+p; ret
307: (1-9*r1)*.5+p2
308: 2*ln((1+p2)/2)+p; ret
309: "rho": if r1<0; .74r1(1-15r1)*.5/(1-13r1)*.33+p; ret
310: r1(.74+4.7r1)/(1+4.7r1)+2+p; ret
311: "profile": p1+k+8; n2+0+0; 3+1+X; p1*p2+X+W; r1+2+Y+Y; ret
312: "regression": .35(p*2-X*3)/(R*2-X*Y)+p; ret
313: "mark": 0+Y[1]; for i=0 to 1; rew; trk i; mark 1,50; 4+Y[2]; ret 0,Y[*]
314: trk 61,2200; next i; trk 0; ret
315: "scaling": -T[r1,3]*T[r1,4]+T[r1,6]; -T[r1,3]*T[r1,5]+T[r1,7]
316: (.034aps(T[r1,6])*M[r1,8])*(1/3)*sgn(p1)+T[r1,8]
317: if T[r1,8]=0; 0+T[r1,9]; 0+T[r1,10]; ret
318: T[r1,6]/T[r1,8]+T[r1,9]; abs(11.31/50T[r1,8])+T[r1,10]; ret
319: "****" FOR FILE C6L SUBROUTINES "****"
320: "avevar": for i=1 to 5; if C[i,2]=0; jmp 2
321: C[i,1]/C[i,2]+r1;r1+E[i,1]+E[i,1]; r1+2+E[i,2]+E[i,3]+E[i,3]
322: next i; if U[1,3]=0; ina U,C; ret
323: deg; for w=2 to 3; 0+r0; for i=1 to U[1,3]; 10U[i,1]+r1; 103U[i,3] mod 360+r2
324: 61.03U[i,2]+r3; if i=2; 0+r3
325: r1sin(r2)-r3+r4; r1cos(r2)-p[1]+r6
326: Y(r1+2+r3+2+p[1])+2-2r1(r3sin(r2)+p[1]cos(r2))+r5
327: if r4>0; aas(r6/r5)+r7; jmp 3
328: if r6>0; 360+aas(r4/r5)+r7; jmp 2
329: 180-aas(r4/r5)+r7

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330: r7-r0+r1;abs(r1)+r2
331: if r2>=130;(sgn(r1)(r2-350)/(r0+r0)mod360+r0;jmp 2
332: r1/r+r0+r0
333: next I;fti ((r0+r0)mod360)+E[N-1,2P[4]-1,2P[4]]:next ",ina C,U;ret
334: "varcal":for I=1 to 2;if L[I,4]>39;jmp 3
335: if E[I,3]<2;0+E[I,1];jmp 2
336: 5.14*((E[I,2]-E[I,1]+2/E[I,3])/(E[I,3]-1))+.5+E[I,1]
337: if E[I,2]>39;jmp 4
338: if E[I+2,3]<2;jmp 3
339: 2+1+5;((E[K,2]-E[K,1]+2/E[K,3])/(E[K,3]-1))+.5+E[K,1]
340: if E[I,1]#0;if E[K,1]#0;4+E[K,1]/E[I,1]*N[I,2]*/(5.14+E[I,4])→X[I,2]
341: next I;if E[5,3]>1;193*((E[5,2]-E[5,1]+2/E[5,3])/(E[5,3]-1))+.5+E[1]
342: E[1,1]+5[2];E[2,1]+3[3]
343: ret
344: "AVG0033":p1-p2+p1;abs(p4)+p5
345: 1+p3+p3;if p5>=160;(p4/p5)(p5-360)+p5;(p5/p3+p2)mod360+p2;jmp 2
346: p2+p4/p3+p2
347: ret
348: "COURSE":dsp "COURSE CIA032";for I=1 to 10;beep;wait 1000;beep;next I
349: dsp "Course change",P[2],"to",C,".Cont";if flag;jmp 4
350: str
351: ent "c'to continue 'b' begins over",p5;if p5="c";ret
352: if p5="b";beep;jmp -1
353: tnt 2x,cl0;red 700,P[1];(val(P[1,7,3])+1)mod360+T;gto "meas"
354: "LOJY":val(P[2,5,6])+val(P[2,7,3])/5)+val(P[2,9,10])/3600+p5
355: (p5-a)mod24+p5
356: acs(cos(p4)cos(p2)+sin(p4)sin(p2)cos(p3-p1))+p5
357: (3432.45+.129p4)p5*2*π/360;p5+p[9]
358: acs((cos(p4)-cos(p2)cos(p6))/sin(p2)sin(p6))+p7;p7mod360+p7
359: if p7<=90 and p3<=1;p7+p[10];jmp 4
360: if p7<=90;350-p7+p[10];jmp 3
361: if p3<=p1;p7+p[10];jmp 2
362: 90+p7+p[10]
363: P[10]mod360+p[10];ret
364: "DIR":wth 4,2;wait 1;band(shf(emrdb(4),2),32767)+p2;wtb 4,0
365: 0+p3+p1;for N=0 to 6;hit(p3+d,p2)+p4;p1+2+N*p4+p1
366: if p4=1;0+p3;jmp 2

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THE BDM CORPORATION

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367: 6→n3
368: next 1;127-n1+n1;(17.5+n1)mod128/128*360→0;ret
369: "LOPAR":if bit(0,rdb(4))=0;ret
370: wrt 4,192+32;wrb 4,192;if bit(1,rdb(4))=1;jmp 0
371: for n1 to 80;rdb(4)→v[n];next n
372: if bit(1,rdb(4))=1;jmp -2
373: 0→n1+n4→n5;for n=0 to 7;if n#4;1+n1+n1
374: 10*(n1-5)→n3;n4+'bcd'(7+4*n)*n3+n4;n5+'bcd'(47+4*n)*n3+n5;next n
375: n1(1-2v[3])→p[8];n5(1-2v[47])→p[7];wrb 4,0
376: for n=7 to 8;abs(p[n])→n4;int(n4)→n5;100frc(n4)/60→n6
377: n5+n6→p[n];next n;ret
378: "bcd":v[n1]+2v[n1+1]+4v[n1+2]+8v[n1+3]→n2;if n2=15;0→n2
379: ret n2
380: "short":for n=1 to 8;Q[E]/P→Q[E];next E
381: 108Q[7]mod360→R→Q[7];10Q[5]→S→Q[5]
382: deg:√(a+2+p[1]+2-23*p[1]*cos(R))→r1;r1→Q[6];asin(R)/r1→S
383: (-p[1]+3cos(R))/r1→Q;if Q>0;asin(S)→Q[8];jmp 3
384: if S>0;ecs(Q)→Q[8];jmp 2
385: 130-asn(S)→Q[8]
386: Q[8]+2(2)mod360→Q[8]
387: Q[1]-Q[3])/0.00385E[3]→Q[1];10(Q[4]-1)→Q[4]
388: Q[2]-Q[2])/0.00385E[2]→Q[2];(Q[3]-Q[5])/0.00389E[5]→Q[3]
389: fxd 4;fmt 5x,c9,f11.4,5x,c9,f11.4,/
390: wrt 5,"latitude",p[8],"longitude",p[7]
391: fxd 0;fmt 5x,c13,f6.0,z;wrt 5,"ships heading",p[2]
392: fxd 1;fmt 6x,c11,f6.1,2/;wrt 5,"ships speed",p[1]
393: fxd 2;fmt 7,10x,c15,f10.2,1x,c3,2/
394: wrt 5.7,"sea temperature",Q[1],"(c)";wrt 5.7,"air temperature",Q[2],"(c)"
395: wrt 5.7,"dew temperature",Q[3],"(C)";wrt 5.7,"ir temperature",Q[4],"(c)"
396: fxd 1;wrb 5,10;fmt 9,10x,c17,f10.1,2x,c5,f10.1,2x,c6,/
397: wrt 5.0,"wind speed (knts)",Q[5],"(fel)",Q[5],"(true)"
398: wrt 5.0,"wind direction",Q[7],"(rel)",Q[8],"(true)"
399: ret
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... THE BDM CORPORATION

b. MET-AEROSOL STREX

THE BDM CORPORATION

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0: "WTOAS STREX":sft 11
1: a1=AS[15,4],H3[123],15[60],15[480],US[60],XS[24],",",H,3,Z[11]
2: a1=AS[1300],25[10],CS[3]
3: a1=AS[10],2[10],0,C[3],5[3],F[8,15],F[10,10],G[10],H[4,6],K[3,5]
4: a1=L[3,5],",",F[8],O[8,15],P[3,5],F[8,16],S[3,15],T[8,15]
5: a1=U[3,5],V[2,3],V[2,15],X[6],Y[6]
6: 35+5[1];11+3[2];43+5[3];6+3[4];64+3[5];42+3[6];37+3[7];38+3[8]
7: for J=4 to 5;40+3[3,1]+L[3,J];next J
8: for J=1 to 5;1+3[1,1]+L[1,1];next J;5+K[2,1]+L[2,1];6+K[2,2]+L[2,2]
9: 10+K[2,3]+L[2,3];11+K[2,4]+L[2,4];15+K[2,5]+L[2,5]
10: for J=1 to 3;6+J+K[3,1]+L[3,J];next J
11: 99.5999+3[1];99.4823+3[2];99.4433+3[3]
12: "SP1"→AS[1];"BIR"→AS[2];"SIR"→AS[3];"SSP1"→AS[4];"<V>"→AS[5]
13: "PR"→AS[6];"P"→AS[7];"IR1"→AS[8];"IR2"→AS[9];"VRES"→AS[10]
14: "PDEV"→AS[11];"FAIR"→AS[12];"FSEA"→AS[13]
15: .026+3[1,1];.217+3[1,2];.632+3[1,3];1.177+3[1,4];1.734+3[1,5]
16: 2.346+3[1,6];3.05+3[1,7];3.787+3[1,8];4.5+3[1,9];5.393+3[1,10]
17: 6.133+3[1,11];6.903+3[1,12];7.652+3[1,13];8.36+3[1,14];9.012+3[1,15]
18: 9.15+3[2,1];8.54+3[2,2];7.93+3[2,3];7.32+3[2,4];6.71+3[2,5]
19: 6.1+3[2,6];5.49+3[2,7];4.88+3[2,8];4.27+3[2,9];3.66+3[2,10]
20: 3.05+3[2,11];2.44+3[2,12];1.83+3[2,13];1.22+3[2,14];.61+3[2,15];28+3[1]
21: wto 9,0;rer 709;rer 711;rer 704;110 7;715+4;iev "1",1;14k 1;buf "0",3,3
22: rer 722;wrt 794,"A56";wrt 722,"E1P4F03A0"
23: "formats":fmt 0,10x,z
24: fmt 1,f3.0
25: fmt 2,e1,f3.0,z
26: fmt 3,"date",f3.0,"/",f2.0,"/",f2.0," time ",f4.0,"; ",f2.0," (PST)."
27: fmt 4,"averaging time = ",f4.1," minutes", " no. averages ",f4.0
28: fmt 5,"probe voltage A = ",f6.3," volts"
29: fmt 6,e10.2,z
30: fmt 7,"Tape #",f3.0," file #",f3.0," STREX"
31: fmt 8,"Polynomial of order ",f2.0,z
32: fmt 9,e15.7,z
33: "PDSER":dcp "DET ALL FLAGS (CONF).";stp

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1

19

THE BDM CORPORATION

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71: 1+L[3]+J[3];next L;next J;1+H+I;jmp 4
72: "p1":0+P2;jmp 2
73: "p2":rand(cmodrb("Q"),255)+03;band(03,15)+10shf(03,4)+02
74: band(cmodrb("Q"),255)+04;band(04,15)+10shf(04,4)+100+2+P1;ret
75: wait 50;wrt 704,"A55";wait 50;wrt 722,"F1F4P2A340";for L=1 to 5
76: for f=1 to 2;for J=1 to 5;if L[1,J]>39;jmp 5
77: fnt f3.0;wrt 709,"C",L[1,J];wait 5
78: trs 722;fnt f;red 722,f;f+P[1,J]+P[1,J]
79: if L=1;if J=1;f+V[1,1]+V[1,1];jmp 2
80: if L=1;if J=5;f+V[2,1]+V[2,1]
81: next J;next I;1+H+I
82: cll 'AVDEDE33'(P[1,2),J[1,2),I);cll 'AVDEDE33'(P[1,3],J[1,3],I)
83: next I;cell 'D131A'
84: wrt 704,"356"
85: wait 50;wrt 722,"F5H1P2A320";for J=1 to 3;if L[3,J]>39;jmp 3
86: fnt 2F3.0;wrt 709,L[3,J]+5,L[3,J];wait 5;trq 722;fnt f;red 722,f
87: f+P[3,J]+P[3,J];wrt 709,"C";if F<100;if F>110;sto
88: next J;if F<4;sto "data"
89: fnt 2X,cl0;red 708,45
90: "***GET CALCULATIONS***"
91: for I=1 to 2;for J=1 to 5;if L[1,J]>39;jmp 2
92: f[I,J]/J+P[1,J]
93: next J;next I;for f=1 to 3;if L[3,J]>39;jmp 2
94: f[3,J]*5/A+P[3,J]
95: next J;P[1,5]+J[1,5];P[2,5]+J[2,5]
96: "FOUR WIRLS":.003692+rl;(P[3,1]-5[1])/rl0[1]+J[3,1]
97: .00365+rl;for I=2 to 3;if L[3,I]>39;jmp 2
98: (P[3,I]-J[1])/rl0[1]+J[3,I]
99: next I
100: for I=3 to 4;19(P[2,I]-1)+J[2,I];next I
101: 8P[1,4]+J[1,4]
102: 10P[1,1]+J[1,1]
103: 100P[2,1]+J[2,1]
104: for I=1 to 2;((V[I,3]-V[I,2]*2/H)/(I-1))*5+V[I,1];next I
105: 5.14V[1,1]+V[1,1]
106: J[1,2]+6;J[1,1]+J[1,4]+3
107: 50;Y(V*2+5*2-2V6cos(P))+rl;.31rl+J[3,4]+5{J};V6ia(P)/rl+r2

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105: (-3+vecc(r))/r1+r3;if r>0;accn(r2)+u[3,5];jmp 3
109: if r2>0;accs(r3)+u[3,5];jmp 2
110: 130-accn(r2)+u[3,5]
111: (u[3,5]+u[1,5])cc3300+u[3,5];c11 'SCALCALC'
112: for i=1 to 4;.25*(11)+u[1];next i;30.4*(5)+u[5];30.4*(6)+u[6]
113: for i=7 to 9;.15.43*2u[1]+u[1];next i
114: for i=1 to 5;for j=1 to 15;if c[i,j]=0;1+3{i,j}
115: next j;next i
116: for i=1 to 9;for j=1 to 15;s[i,j]/u[i]+p[i,j];next j;next i
117: for i=7 to 9;for j=1 to 15;s[i,j]/(u[i]-c[j])*u[i]+p[i,j];next j;next i
118: for i=1 to 4;for j=1 to 8;i[i,j]/1000/u+i[i,j];next j;next i
119: for i=1 to 8;for j=1 to 15;p[i,j]/(r[i,j]+1)-p[i,j]+p[i,j]+c[i,j]
120: next j;next i
121: "nat":ina A,P;for i=1 to 3;if i=1 or i=6;c+r1+r2+r3+r4+r5+r6+r7+r8+r9
122: for j=x[i]+1 to 16;1+3;if j<15;jmp 5
123: if i>1 and i<6;goto "next"
124: if i=1;-1.5*x;goto "1"
125: if i=8 and r9#0 and r7#0;log(r3/r9)+x;log(r7/r9)+p;1+r5;goto "3"
126: 2.2*x;goto "1"
127: if c[i,j]=0 and i<6;goto "next"
128: 4*pi/3*u[i,j]+3*c[i,j]+o[i,j]
129: if r9#0;goto "extrap"
130: if c[i,j]=0 and i>5;goto "extrap"
131: log(c[i,j]+p);log(e[i,j])+x
132: if i=1 and j<9;goto "3"
133: if i<6;goto "2"
134: goto "3"
135: "extrap":r9+1+r; r7+c[i,j]+r7;r3+E[i,j]+r3;goto "next"
136: "3":r0+x+r0;r1+x+r1;r2+1+r2;r3+p+r3;r4+p+r4;if r5=0;goto "2"
137: x+3[9];p+3[10];1.5*x
138: "1":(r3r2-r4r1)/(r3r2-r1r1)+u[2]
139: (r0r4-r3r1)/(r0r2-r1r1)+u[1];u[1]+u[2]*p
140: "2":for k=0 to c;c+1-k+r;3+p[r,R]+p[r,R]
141: p+A[r]+u[r];p*x+p;3x+3
142: if k#0;3+p[r-1,R]+p[r-1,R]
143: 3*x+3;next k
144: "next":next j;next i;if r5#0;sf3 12

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THE BDM CORPORATION

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1145: for I=1 to C+1
1146: for K=1 to int((C+1)/2)
1147: if I41 and 1+K<=2 and I-K>0;F[I,I]→F[I-K,I+K]→F[I+K,I-K]
1148: if 1+K<=C+1 and I-K+1>0;F[I,I+1]→F[I+K,I-K+1]
1149: if 1+K<=C and I-K>0;F[I,I+1]→F[I-K,I+K+1]
1150: next K;next I;inv F→F;ret FA→J
1151: "3lt":D→E;D+1→D;rcf 0,0,C[*];if D-1>C[1];trk 1;D-C[1]-2→E
1152: rcf J;if flg7;sto "SKIP PRINT"
1153: "out":wrt "1.7",C[3],D-1;if flg3;jmo 3
1154: D→Y[1];val(Z$[1,2])→Y[2];val(Z$[3,4])→Y[3];val(Z$[5,6])→Y[4]
1155: val(Z$[7,8])→Y[5];val(Z$[9,10])→Y[6]
1156: wrt "1.3",Y[2],Y[3],Y[1],100Y[4]+Y[5],Y[6]
1157: wrt "1.4",F,H;wrt "1.5",U[1,1];wth 4,10,13;if flg0;ret
1158: fnt 11x,c5,16x,c9,11x,c14,z;wrt "1", "Snap", "True Wind", "Relative Wind"
1159: wth 3,13;c11 "SPACE"(7)
1160: for I=1 to 3;for J=1 to 13;wth 1,95;next J;c11 "SPACE"(10);next I
1161: fnt /,4x,c11,f5.1,7x,c11,f5.1,7x,c11,f5.1;U[3,4]/.514→r1
1162: wrt "1", "Speed(kts):",U[1,4], "Speed(kts):",r1,"Speed(kts):",U[1,1]
1163: fnt 7x,c3,f5.0,10x,c8,f5.0,10x,c8,f5.0,/
1164: wrt "1", "Heading:",U[1,3], "Heading:",U[3,5], "Heading:",U[1,2]
1165: fnt 3x,c2,6x,c2,6x,c2,5x,c1,4x,c4,7x,c3,7x,c2,7x,c,2
1166: wrt "1", "rs", "rd", "r1", "fir1", "fir2", "z/c", "RH", "B"
1167: fnt 6x,c,6x,c4,5x,c2,5x,c3,z;wrt "1", "V", "Vras", "U*", "U*E"
1168: wth 1,13;for I=1 to 109;wth 4,95;next I;wth 4,10,13
1169: fnt x,f5.2,2x,f5.2,2x,f5.2,2x,f5.2,2x,f5.2,x,r10.2,2x,f6.2,4x,f5.1,z
1170: Z[1]→r1;if flg11;U[2,2]→r1
1171: wrt "1",U[3,3],U[3,2],U[3,1],U[2,3],U[2,4],Z[10],r1,3
1172: fnt 2x,f5.1,3x,f5.1,2x,f5.3,2x,f6.3
1173: wrt "1",U[1,5],U[2,5],Z[4],Z[8]
1174: wth 4,10,"Raw Counts",10,13;for J=1 to 15;for I=1 to 8
1175: wrt "1.6",S[I,J];next I;wth 1,10,13;next J;wth 4,10,13
1176: wth 3,"da/dr",10,13;for J=1 to 15;for I=1 to 8;wrt "1.6",F[I,J]
1177: next I;wth 4,10,13;next J;wth 4,10,13
1178: if not flg9;jmo 3
1179: wth M,"Radii";wth 4,10,13;for J=1 to 15;for I=1 to 8;wrt "1.6",C[I,J]
1180: next I;wth 4,10,13;next J;wth 1,10,13;cfq 9
1181: if not flg2;wth 1,12;sto "SKIP PRINT"

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182: sf4 0;wtb 8,12,13;cll 'out';cf4 0;wtb 1,27,65,-4,0,7,32,"log(1V/gr)"
183: wtb 1,27,65,1,55,7,32;wrt "1.3",C;5.01-1/5+Y
184: for I=1 to C+1;wtb 8,27,65,1,55,int(3Y/2),int(96Y)
185: wrt "1.9",3[I];Y-1/6+Y;next I
186: wtb 8,27,65,-4,-210,-1,-16,"log(radius)"
187: -1+3;-4+Y
188: wtb 1,27,65,int(15X/4),int(240X),0,0
189: if X#0 and Xmod1=0;wtb 4,"1",10,8,8,8;wrt "%.1",X;qto +2
190: wtb 8,"-"
191: if (X+.05+Y)<2.3;qto -3
192: wtb 1,27,65,0,0,int(1.5Y),int(96Y)
193: if Y#0 and Ymod1=0;wrt "1.2","-",Y;qto +2
194: wtb 8,"1"
195: if (Y+.1+Y)<5.1;qto -3
196: for I=1 to 8;for J=X[I]+1 to 15
197: if R[I,J]=0 or O[I,J]=0;qto "next"
198: log(C[I,J])+X;log(O[I,J])+Y
199: wtb 1,27,65,int(15Z/4),int(240X),int(3Y/2),int(96Y)
200: wtb 1,3[I]
201: "40X":next J;next I;if not fl412;jmp 2
202: wtb 8,27,65,int(15Z[9]/4),int(240X[9]),int(3Y[10]/2),int(96X[10]),"e"
203: -1+X;0+Y;cf4 12
204: "crv":0+Y;if X>2;qto "below"
205: for I=1 to C+1;YX[C[I]]+Y;next I
206: Y+1[I];jmp 3
207: "below":if X>2.1;if Y[2]>0;Y[6]+Y;jmp 2
208: Y[4]+Y[2]*(X-2)+Y+Y[6]
209: if Y<-4 or Y>5;jmp 4
210: Y+5/36+Y
211: wtb 8,27,65,int(15X/4),int(240X),int(3Y/2),int(96Y)
212: wtb 4,"-"
213: if (X+1/120+X)<2.2;qto "crv"
214: wtb 8,10,12,13
215: "SKIP PRINT":for I=1 to 4;for J=1 to 8
216: 32(I-1)+K;fts (R[I,J])→R[X+4J-3,X+1J];next J;next I;for I=1 to 8
217: for J=1 to 15;60(I-1)+K;fts (R[I,1])→R[X+1J-3,X+4J];next J;next I
218: for I=1 to 5;fts (Y[I])→Y[4I-3,4I];next I

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219: for I=1 to 3;for J=1 to 5;20(I-1)+3;fts (P(I,J))→IS(IJ-3+K,4J+K)
220: fts (U(I,J))→US(4J-3+K,4J+K);next J;next I
221: if fl17;1sr "FILE",0,"PRINT SUPPORTER";jnc 2
222: 2sp "RECORDING FILE",0-1,"MAX. NO.",C(1)+C(2)
223: if C(1)+C(2);c11 "tuncrk"
224: ref C(15,15,15,US,YS,T,H,5,5[*]);trk 0;fde 0
225: "STATUS":if fl11;cf1 1;gto "P33EP"
226: if fl15;cf1 5;1so "POLV=","C,"low="?" ;ent "","C;2+1→P;rdm A[R],C[P],F[R,R]
227: if fl16;cf1 6;1so "Averaging time=","P","low="?" ;ent "","P;int(3P)→Z
228: if fl13;cf1 3;c11 "SENSOR STATUS"
229: gto "start"
230: "tuncrk":for I=1 to 5;beep;wait 500;next I
231: det "Insert new cassette,continue.";sto
232: 2sp "Are you sure?Continue.";sto
233: ent "Pare number?",C(3)
234: trk 0;rew;trk 129;050;rew;129→C(1)→C(2);1→0
235: ref C(0,C[*]);rew;trk 1;trk 129;050;rew;trk 0;ret
236: "AV33037":7291→c1;01→02→04;abs(04)→05
237: if 05>130;(04/05)(05-360)→06;(06/03+02)00360→02;jnc 2
238: 02+04/03→02
239: 0→01;ret
240: "SENSOR STATUS":ret "SENSOR STATUS";prt "DEACTIVATED"
241: prt 2511,218"/"025[3,4]e" at "025[5,8]
242: for I=1 to 3;for J=1 to 5;if L(I,J)>40;prt AS[5(I-1)+J]
243: next J;next I;ret
244: "SENSOR3":ent "ACTIVATE(a),DEACTIVATE(J) OR (E)",CS;if CS="F";ret
245: if CS="a" and CS="d";beep;jnc -1
246: ent "SENSOR NAME",US;if US="F";jnc -2
247: for I=1 to 3;for J=1 to 5;if US=AS[5(I-1)+J];jnc 2
248: next J;next I;beep;jnc -2
249: if CS="a";41→I(I,J);jnc -3
250: K(I,J)→L(I,J);jnc -4
251: "SICIA":for I=1 to 2;V(I,J)/(U-1)→Q;Q+V(I,2)→V(I,2)
252: Q+V(I,3)→V(I,3);0→V(I,1);next I;ret
253: "3CALCALC":2(0)→r1;U(3,3)→r2;U(3,2)→r3;U(3,1)→r4;rad
254: if r1<.01;ina 2;23→2(1);ret
255: if r1<2.2;.001*1.03*r1+(-.15)→r5;jnc 4

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THE BDM CORPORATION

c. AEROSOL 9835

THE BDM CORPORATION

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1  I P13 AEROSOL PROJRA1 FULLDF 9835
10 OPTIOJ BASE 1
20 COM RV(0:0),Flag(0:15),C,K,J,SHORT G(10),B(9,52)
30 DIM QS[1284]
40 SHORT Q(1284),A(10),E(10,10),Ext(9),Gam(5)
50 SHORT Y(5),B(6,15),P(6,15),O(6,15),I(6),X(6),T(1),H(16)
60 SHORT R(6,16),R(6),E(6,15)
70 COSUB Setup
80 DISP "INSERT DATA CARTRIDGE"
90 PAUSE
91 INPUT "JEV TAPE(NEW) OR OLD(O)",QS
92 IF QS="JEV" THEN COSUB Harkup
100 ASSIGN #9 TO "INDEX0"
110 READ #9;D,R,Tape_num
120 ASSIGN #9 TO *
130 Partc=2
140 PRINTER IS 16
150 INPUT "AVERAGING TIME IN MINUTES",T
160 Z=INT(1.5*T)
170 G(6)=J(4)=J(2)=J(1)=0
180 J(3)=0
190 J(5)=0
200 R(1,1)=.0845
210 R(1,2)=.0375
220 R(1,3)=.0905
230 R(1,4)=.094
240 R(1,5)=.098
250 R(1,6)=.102
260 R(1,7)=.1055
270 R(1,8)=.111
280 R(1,9)=.1155
290 R(1,10)=.12
300 FOR J=11 TO 16
310 R(1,J)=R(1,J-1)+.005
320 NEXT J
330 FOR J=1 TO 16
340 R(2,J)=(.23+.025*(J-1))/2

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THE BDM CORPORATION

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350 R(3,J)=.2+.02*(J-1)
360 R(4,J)=.3+.08*(J-1)
370 R(5,J)=.25+.25*(J-1)
380 IF R(5,J)>1 THEN P(5,J)=.767*R(5,J)+.233
390 R(6,J)=1+(J-1)
400 R(6,J)=.767*R(6,J)+.233
410 NEXT J
420 FOR I=1 TO 6
430   FOR J=1 TO 16-N(I)
440     R(I,J)=R(I,J+M(I))
450   NEXT J
460 NEXT I
470 FOR I=1 TO 6
480   FOR J=1 TO 15-N(I)
490     E(I,J)=(R(I,J+1)+R(I,J))/2
500   NEXT J
510 NEXT I
520 Start: Z=1.5*T
530 H=K=0
540 FIXED 0
550 NAT H=(0)
560 NAT S=(0)
570 NAT A=(0)
580 NAT Flag=(0)
590 DEFAULT OFF
600 Data:DISP "WAITING FOR DATA X-FER #";K;"FILE";D+1
610 ENTER Partc BFM3 1234 USING "#,1234A";D$
620 K=K+1
630 Flag(2)=0
640 L=1
650 GOSUB R1
660 Y(5)=PVI
670 L=L+1
680 GOSUB R1
690 A=PVI
700 GOSUB R1
710 B=PVI

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THE BDM CORPORATION

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720 B=10*SHIFT(S,4)
730 A=SIGN(A,3)
740 B=SIGN(B,3)
750 DISP Y(5),A,3
760 Loop: Flag(1)=0
770 FOR J=1 TO 20
780 Flag(1)=Flag(1) EXOR 1
790 FOR I=0 TO 15
800 GOSUB R2
810 Q=PV1
820 IF I<>0 THEN GOTO Bin
830 IF NOT (J<3) THEN 870
840 Y(2*J-1)=INT(Q/100)
850 Y(2*J)=100*FRACT(Q/100)
860 IF Y(1)<>30 THEN GOTO Data
870 IF J<5 THEN GOTO Next_
880 H(J-4)=2+H(J-4)
890 GOTO Next_
900 Bin: IF NOT Flag(1) THEN 930
910 S=A+1
920 GOTO 970
930 IF NOT (B<2) THEN 960
940 S=5
950 GOTO 970
960 S=6
970 S(S,1)=Q+S(S,1)
980 Next_: NEXT I
990 H(S)=1+H(S)
1000 NEXT J
1010 Flag(2)=Flag(2) EXOR 1
1020 IF NOT Flag(2) THEN 1040
1030 GOTO Loop
1040 IMAGE IIA,8A
1050 PRINT USING 1040;VAL$(Y(2))&" / "SVAL$(Y(3))&" / "SVAL$(Y(1)),VAL$(Y(4))&"
: "SVAL$(Y(5))
1060 H=H+1
1070 IF K<2 THEN GOTO Data

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1080      DISP "file #";D+1;"max file #";R
1090      GOSUB Fit
1100      GOTO 5P
1110      R1:PV2=0
1120      GOTO 1100
1130      R2: PV3=BINAD(PV3,15)+10*SHIFT(PV3,4)
1140      L=L+1
1150      PV2=BINAD(PV3,15)+10*SHIFT(PV3,4)
1160      PV4=BINAD(PV3,15)+10*SHIFT(PV3,4)
1170      L=L+1
1180      PV1=BINAD(PV4,15)+10*SHIFT(PV4,4)+100*PV2
1190      RETURN
1200      5P:E=D+1
1210      ASSIGN 19 TO "INDEX"
1220      PRINT #9;D,R,Tape num
1230      ASSIGN 19 TO *
1240      GOTO 1600
1250      Fit:FOR J=1 TO 15
1260      FOR I=1 TO 6
1270      IF NOT (I<>5) THEN 1290
1280      IF S(I,J)=0 THEN S(I,J)=1
1290      NEXT I
1300      NEXT J
1310      IF P=3
1320      FOR I=1 TO 4
1330      J(I)=.26*J(I)
1340      NEXT I
1350      J(5)=30.4*J(5)
1360      J(6)=30.4*J(6)
1370      FOR J=1 TO 15
1380      H(J)=H(J)/(2000*H)
1390      T(1)=S(4,J)/H(4)
1400      S(4,J)=S(1,J)/H(1)
1410      S(1,J)=T(1)
1420      T(1)=S(3,J)/H(3)
1430      S(3,J)=S(2,J)/H(2)
1440      S(2,J)=T(1)

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1450 T(1)=S(5,J)/U(5)
1460 S(5,J)=S(6,J)/U(6)
1470 S(6,J)=T(1)
1480 NEXT J
1490 H(15)=H(16)/(2000*H)
1500 FOR I=1 TO 6
1510 X(I)=H(I)
1520 NEXT I
1530 FOR I=1 TO 6
1540 FOR J=1 TO 15-A(I)
1550 S(I,J)=S(I,J+X(I))/(X(I,J+1)-X(I,J))
1560 NEXT J
1570 NEXT I
1580 MAT C=S
1590 RETURN
1600 GOSUB POLY
1610 ASSIGN #9 TO "AERO"
1620 PRINT #9,S;5(*),H(*),Y(*),X(*),P,Ext(*),Gam(*),J(*)
1630 ASSIGN #9 TO *
1640 PRINT IS 16
1641 IF D=R THEN GOSUB larkup
1650 GOTO Start
1660 Prt:PAGE #,69.25,1X,ND.2DE
1670 PRINT USING 1655; (R(I,J+1)+R(I,J))/2,S(I,J)
1680 RETURN
1690 Setup:DEC
1700 E=61 Setup
1710 A=1
1720 ASSIGN #9 TO "AIECOR"
1730 READ #9;J(*)
1740 PAGE 30
1750 PAGE #,K,30
1760 PAGE "Date",30,"/",20,"/",20," time",30,":",20," at end of run"
1770 PAGE /,"Averaging time = ",30," minutes"
1780 PAGE "Probe voltage A = ",20.30," volts"
1790 PAGE #,1X,19.2DE
1800 PAGE "Page #",30," File #",30

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THE BDM CORPORATION

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1310 IMAGE F,"Polynomial of order ",20
1320 IMAGE F,1X,10.70E
1330 C=7
1340 I=C+1
1350 READ A(I),J(I),P(I,I)
1360 ELSE "Printer on, set form, push cont"
1370 PAUSE
1380 WRITE BIN 1;27,69,27,64,32,32,32,32,27,77,27,76,15,0,14
1390 WRITE BIN 1;27,79,15,48,6,32
1400 RETURN
1410 POLY: FOR I=1 TO 3
1420 FOR J=1 TO 3
1430 O(I,J)=0
1440 NEXT J
1450 NEXT I
1460 O(5,1)=O(6,1)=0
1470 FOR J=1 TO 15
1480 O(4,J)=0
1490 NEXT J
1500 Jcont=Jacc=Jcont=Vacc=Vjacc=0
1510 R0=E1=E2=R3=R4=0
1520 W A=ZER
1530 W P=ZER
1540 FOR I=1 TO 5
1550 FOR J=1 TO 10
1560 G=1
1570 IF (I=1) AND (J=16) THEN GOPO Left
1580 IF (I=6) AND (J=16) THEN GOPO Right
1590 IF J>15 THEN GOPO Nextt
1600 IF O(I,J)=0 THEN GOPO Nextt
1610 P=G*LSF(O(I,J))
1620 X=LGT(E(I,J))
1630 IF I<3 THEN GOSUB Junjc
1640 IF I>2 THEN GOSUB Gamma_it
1650 IF (I=1) AND (J<9) THEN GOPO Inree
1660 IF I=6 THEN GOPO Three
1670 GOPO Two

```

THE BDM CORPORATION

```

2170 Left: X=-1.5
2180 GOTO One
2190 Right:K=1.5
2200 GOTO One
2210 Three:R0=R0+X*X
2220 R1=R1+X
2230 R2=R2+I
2240 R3=R3+P*X
2250 R4=R4+P
2260 GOTO Two
2270 One:P=((R3*R2-R1*R1)*X+R0*54-R3*R1)/(R0*R2-R1*R1)
2280 R0=R1=R2=R3=R4=0
2290 PRINT USING "DD.DD,XX,DD.DD";X,P
2300 IF I=6 THEN G=5
2310 Two:FOR K=0 TO C
2320 F(C+1-K,C+1-K)=G+F(C+1-K,C+1-K)
2330 A(C+1-K)=P+A(C+1-K)
2340 P=P*X
2350 G=G*X
2360 IF K<>C THEN F(C-K,C+1-K)=G+F(C-K,C+1-K)
2370 G=G*X
2380 NEXT K
2390 Next:GOTO J
2400 GOTO I
2410 FOR I=1 TO C+1:POLY
2420 FOR K=1 TO INT((C+1)/2)
2430 IF JOT ((I<>1) AND (I+K<C+2) AND (I-K>0)) THEN 2450
2440 F(I+K,I-K)=F(I-K,I+K)=F(I,I)
2450 IF (I+K<C+1) AND (I-K+1>0) THEN F(I+K,I-K+1)=F(I,I+1)
2460 IF (I+K<C) AND (I-K>0) THEN F(I-K,I+K+1)=F(I,I+1)
2470 NEXT K
2480 NEXT I
2490 IF F=INV(F)
2500 IF G=P*A
2510 GOTO Gamma cal
2520 IF FLAG(7) THEN GOTO EFF
2530 OUTPUT 1, JSING 1800;Type_num,D! out

```


THE BDM CORPORATION

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2540  OUTPUT I USING 1760;Y(2),Y(3),Y(1),Y(4),Y(5)
2550  OUTPUT I USING 1770;P
2560  OUTPUT I USING 1780;H(1)
2570  WRITE B11 I;10,13
2580  OUTPUT I USING "F,K,3,3";"raw counts",10,13
2590  FOR J=1 TO 15
2600  FOR I=1 TO 6
2610  OUTPUT I USING 1790;F(I,J)
2620  NEXT I
2630  WRITE B11 I;10,13
2640  NEXT J
2650  WRITE B11 I;10,13
2660  OUTPUT I USING "F,K";"d1/ar"
2670  WRITE B11 I;10,13
2680  FOR J=1 TO 15
2690  FOR I=1 TO 6
2700  IF NOT (J>15-(I)) THEN 2730
2710  OUTPUT I USING "F,10X"
2720  GOTO 2740
2730  OUTPUT I USING 1790;S(I,J)
2740  NEXT I
2750  WRITE B11 I;10,13
2760  NEXT J
2770  WRITE B11 I;10,13
2780  OUTPUT I USING "/,15A,1000,00";"JUG1 COEF=",Junge
2790  OUTPUT I USING "15A,1000,00";"GFA1A ZERO=",GFA1A
2800  OUTPUT I USING "15A,1000,00";"Beta =" ,Beta
2810  OUTPUT I USING "15A,10,000";"I ZERO=",NO
2820  OUTPUT I USING "F,3,3,3,2,0,0,K";27,65,I PT(-3,75),I PT(-240),0,16,"log(rad
ius)"
2830  OUTPUT I USING "F,4,3,3,5,3,3,K";27,65,I PT(-1,35),I PT(-120),7,32,"log(d1/
dr)"
2840  WRITE B11 I;27,65,1,56,7,32
2850  OUTPUT I USING 1810;C
2860  Y=5,C1-1/Y
2870  FOR I=1 TO C+1
2880  WRITE B11 I;27,65,1,56,I PT(2*Y/2),I PT(36*Y)

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THE BDM CORPORATION

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2990 OUTPUT 1 USING 1320;3(I)
2995 Y=Y-176
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3250  Crv:Y=0
3270  FOR I=1 TO C+1
3280  Y=Y*X+7(I)
3290  IF Y=1
3300  IF (Y<-1) OR (Y>5) THEN GOTO 3340
3310  Y=Y+5/35
3320  WRITE B11 1;27,65,INT(15*X/4),INT(240*X),INT(3*Y/2),INT(96*Y)
3330  OUTPUT 1 USING "4,5",";"
3340  X=X+1/120
3350  IF X<1.1 THEN GOTO 3270
3360  Break: 1
3370  Y=-1.2
3380  Y=-.3
3390  WRITE B11 1;27,65,INT(15*X/4),INT(240*X),INT(3*Y/2),INT(96*Y)
3400  OUTPUT 1 USING "4,5",";" "wavelength Extinction"
3410  GFF: FOR J=1 TO 9
3420  J=2
3430  Z=0
3440  Par=-1
3450  GOSUB Effof
3460  A=PV2
3470  Flag(12)=0
3480  FOR I=-1 TO 1.4 STEP .1
3490  I=10*(I+.05)
3500  O=10*I
3510  U=I-O
3520  P=10*(I+.1)
3530  V=2-O
3540  J=U/V
3550  A=J*V*V/(6*(P-U))
3560  Y=V/2-X*X/W
3570  J=J+1
3580  Par=I+.05
3590  GOSUB Effof
3600  R=PV2
3610  J=J+1
3620  Par=I+.1

```

THE BDM CORPORATION

```

3630 GOTO 3640
3640 P=PV2
3650 Z=Z+(V-K-Y)*A+X*X+Y*Y
3660 A=F
3670 IF FLAG(12) THEN GOTO 3690
3680 NEXT I
3690 EXT(K)=Z
3700 U=3(K,1)
3710 PRINT USING "DDD.DDD,3X,DD.000";U,Z
3720 S=S-1/S
3730 IF FLAG(7) THEN GOTO 3770
3740 WRITE BIN 1;27.65,INT(15*G/4),INT(240*Q),INT(3*S/2),INT(96*S)
3750 IMAGE #,50.4D,80.3DE,
3760 OUTPUT 1, USING 3750;U,Z
3770 NEXT K
3780 IF FLAG(7) THEN GOTO 3890
3790 WRITE BIN 1;12,13
3800 GETHPT
3810 GOTO 3820
3820 PV2=0
3830 FOR L=1 TO C+1
3840 PV2=PV1*PV2+G(L)
3850 NEXT L
3860 IF (PV1>.5) AND (PV2>0) THEN FLAG(12)=1
3870 I=PV2
3880 PV2=3(K,J)*PI*10*(PV2+2*PV1-6)
3890 RETURN
3900 Junc=Jcount+1
3910 Jacc=Jacc+1*PI/3*2(I,J)+4*Q(I,J)
3920 RETURN
3930 Gamma ft=Gcount+1
3940 Vol=4*PI/3*E(I,J)+3*Q(I,J)
3950 Delr=R(I,J+1)-R(I,J)
3960 Vacc=Vacc+Vol*Delr
3970 V racc=V racc+Vol*E(I,J)*Delr
3980 Vlgracc=Vlgracc+Vol*Ln3(E(I,J))*Delr
3990 RETURN

```

THE BDM CORPORATION

```

4000 Gamma_cal:Gam(1)=Jumye=Jacc/Jcont
4010 A=LOG(Vracc/Vacc)-Vlgracc/Vacc
4020 Gam(2)=Gammaz=(1+(1+4*A/3)+.5)/A/A
4030 Gam(3)=Beta=Vracc/Vacc/Gammaz
4040 P2=EXP(-Gammaz)*Gammaz*(Gammaz-.5)*(2*PI)+.5
4050 Gam(4)=Gofz=P2*(1+(12*Gammaz)+(-1)+(288*Gammaz+2)*(-1)-139/(51840*Gammaz
+3))
4051 Fgacc=Pfacc=0
1050 FOR I=3 TO 6
1070 FOR J=1 TO 15
4030 IF O(I,J)=0 THEN GOTO Summ
4090 R=E(I,J)+(Gammaz-1)*EXP(-E(I,J)/Beta)/(Gofz*Beta+Gammaz)
4100 Vol=4*PI/3*E(I,J)+3*O(I,J)
4110 Delr=R(I,J+1)-R(I,J)
4120 Fgacc=Fgacc+Vol*Delr*Fg
4130 Pfacc=Pfacc+Fj+2*Delr
1140 Summ:GOTO J
4150 NEXT I
4160 Gam(5)=No=Fgacc/Pfacc
4170 RETURN
4130 Markov:DISP "INSERT NEW TAPES"
4170 PAUSE
4200 INITIALIZE "F15"
4210 REMID
4220 CREATE "INDEX0",1,24
4230 CREATE "AERO",360,530
4231 D=0
4232 R=360
1233 Tape_num=Tape_num+1
1234 ASSIG: #1 TO "INDEX0"
4235 PRINT #1;O,R,Tape_num
4236 ASSIG: #1 TO *
4240 REMID
4250 RETURN

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2. Aircraft Programs
 - a. Meteorology 9835

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42

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```

370 SEND BUS 7;"?0";Chan$ (K)&"0"
380 TRIGGER Multimeter
390 TRIGGER Multimeter 3INT;Sample
400 IF K<>C THEN GOTO Jextk
410 FIXED 0
420 DISP "C=";C;
430 FIXED 4
440 DISP "V=";Data(L,C);
450 FIXED 0
460 DISP " F=";File_number;" 3=";L
470 Jextk: NEXT K
480 NEXT Count
490 GOTO Jext1
500 Type: Data(L,K)=Sample+Data(L,K)
510 IF Count=1 THEN GOTO 540
520 Data(L,K)=Data(L,K)/2
530 PRINT #1;Data(L,K),END
540 RETURN
550 Jext1: Data(L,20)=0
560 PRINT #1;Data(L,20),END
570 NEXT L
580 OUTPUT 9;"R"
590 ENTER 9;F2$
600 PRINT #1;F2$,END
610 ASSIGN #1 TO *
620 File_number=File_number+1
630 ON Mode GOTO Check,burst,Clock
640 Check: IF File_number<38 THEN GOTO Cycle
650 GOTO Finish
660 Key_burst: Mode=2
670 RETURN
680 Key_clock: Mode=3
690 RETURN
700 burst: INPUT "INPUT BURST CHANNEL ?, B",B
710 OFF INT #7
720 OUTPUT 9;"R"
730 ENTER 9;F1$

```


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```

740 ENDPROC 7;"2)3";ChanP(0)R"E"
750 FOR L=1 TO 70
760 FOR K=1 TO 19
770 TRIGGER Multimeter
780 ENTER Multimeter 3FH3 15;Data(L,K)
790 IF (L 100 10<>0) OR (K<>1) THEN GOTO Next_K
800 NEXT L
810 DISP "BURST";3;
820 NEXT K
830 DISP "VOLTS ";Data(L,K);
840 NEXT L
850 DISP "30MHz";L
860 Next_K: NEXT K
870 Data(L,20)=0
880 NEXT L
890 OUTPUT 9;"R"
900 ENTER 9;T5
910 ASSIGN #1 TO "DATA"AVALS(File_number)
920 PRINT #1;T5,Data(*),T25,END
930 ASSIGN #1 TO *
940 File_number=File_number+1
950 FOR I=1 TO 5
960 REEP
970 WAIT 100
980 NEXT I
990 IF File_number<38 THEN GOTO burst_continue
1000 GOTO Finish
1010 burst_continue: INPUT "CONTINUE BURST MODE N=0 or Y=1",Reply
1020 IF Reply=1 THEN GOTO Burst
1030 IF Mode=3 THEN GOTO Clock
1040 GOTO Cycle
1050 Clock: OUTPUT 9;"R"
1060 ENTER 9;T5
1070 DISP T5
1080 GOTO Clock
1090 Finish: FOR J=1 TO 10
1100 REEP

```

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1110 101T 100
1120 101T 1
1130 5122 "LIBERT 100 DATA CARTRIDGE"
1140 END

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b. Aerosol

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```
34: out "R";err 2,"R",30
35: jmp r02("R")=30
36: exp "checkin synchro"
37: 255-num(08(4,41))->Y;snf(Y,1)->
38: 255-num(05(44,44))+3;out(3,3)->
39: if Y=2;0->A;jmp 2
40: 1->A
41: jmp 2
42: prt Y,2,A
43: ret
44: lbf 0
*18256
```

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