

36

S-7-2

Audiometry - 7,

Course

STS-7-2

Name

W^m Thornton, CB

NASA, JSC Houston TX

If Found plz. call 713.483.2421

Review of EHT Data-

Pp-107- WSL 1996-

Reduction of Kinesthetic data

Pp-81

Classification - P-129

5 Jun S-7 Final Training

Mon -
 Tues - 0930-1100 - 0930-1100 Air Brg/1G
 12000 - 1300 Misc
 1300 - 1500 44
 Wed -
 Thu 0800 - 1100 1G
 Fri 1230 - 1400 1G

MS-1 P Ldg. Wedergren
 Rcdr. Type
 Gyro -

MS-3 EOG Equip -
 Control box
 Calr lights
 Head Pot

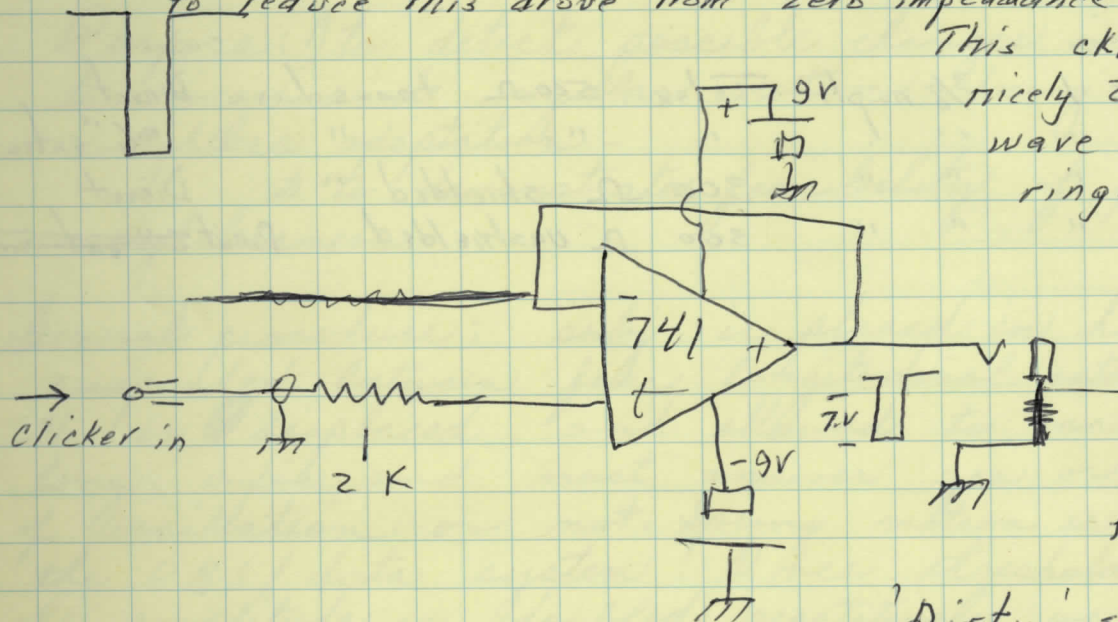
6 7th
 0930 Air Brg.
 1. Threshold Sens
 2. V EOG
 3. Fenzel lens.
 1G - Repeatability - Kinesthetic
 Horiz. EOG
 O.K. Drum -
 EOG
 Tonometry

1G
 Norm
 in
 c/c

B-44 Threshold $\bar{e} \pm \bar{s}$ noise

6 Jun. Driver for Earphone -

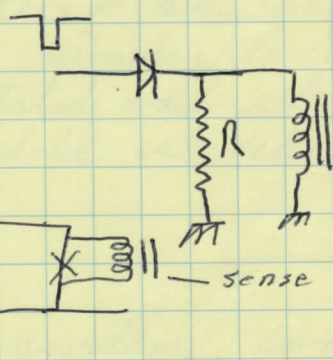
N.B. problem was not amplifier undershoot but ringing. In effort to reduce this drove from 'zero' impedance source below -



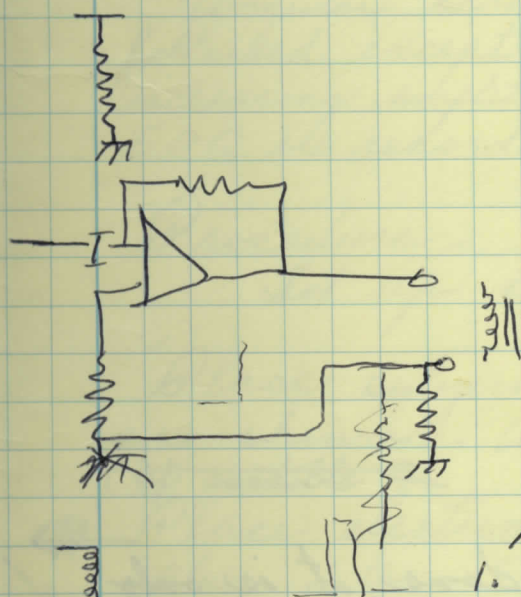
This ckt. drove phone nicely & perfect square wave but magnetic ringing cont'd.

Lenz law
still works
for unit now
is effectively
short cktd.
lead current
ed back.

'Dirty' solns - set R for exponential decay -

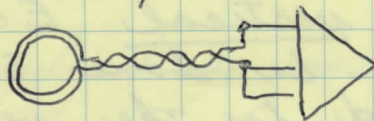
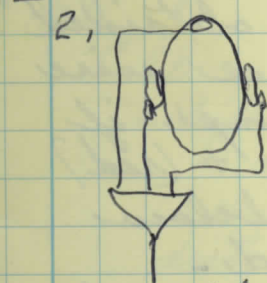


- Only mod improvement -



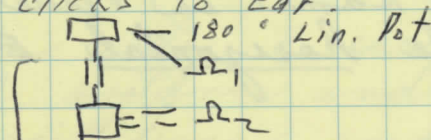
5 layers of mu metal on Xducer,
has $\downarrow$ artefact. Will try in AEP - redr-

1. Set up $\bar{c}$ current probe.



NB - current probe showed little improvement in shielding but in practice reduced artefact to same as neuro response.

To Rdr. $\bar{5}$ transmitting clicks to ear



CR of resistance taper,

$$\Delta R_1 \quad 3.55 \quad 34.96 \quad 350.8$$

24

ΔR_2 ~~9634~~ 9 4380 7884
2 0472 2

June 6

AEPot

Bldg 8

W.T.

(R) EAR

Tape

40-70	Pos 1	$3/8$ ampl.	TELEX	500Ω	transducer	Direct
71-99	" "	" "	" "	" "	" "	" "extension tube
100-130	" "	" "	300 Ω	shielded	" "	Direct
131-160	" "	" "	300 Ω	unshielded	Direct	" "extension tube

* If only linear threshold is done it is only required that vertical EOG be obtained and that can be done $\bar{c}$ a three wire lead connected to the vertical amp. if the C.B. convention is used. Place + (red) electrode above (R) eye & - (white) below (L) eye and grd. (green) on forehead. The same is true for angular accel. & here the horizontal EOG is obtained. $\rightarrow$

Procedures - Threshold sens.

Purpose: 1) to detect possible changes in threshold sens. to linear and angular motion during course of weightless adaptation -
2) to demonstrate feasibility of procedure in weightlessness

General procedure: subj. is placed in harness and suspended between four longitudinal extension springs. He is displaced and allowed to oscillate in the long. axis and must answer yes or no to question of oscillation or not. Spring motion is recorded by the OBS/data system. Once threshold is ^{reliably} detected the amplitude is doubled repetitively up to max. displacement while vertical EOG's are recorded.

Angular threshold: procedure similar to above is followed except the subject is rotated and released at increasing amplitudes until threshold is detected. Horiz. EOG is recorded.

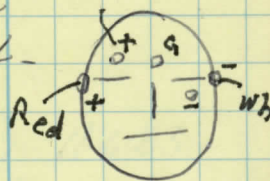
Procedure -

Set up data recording system, control box.

Place subject in rescue harness c 'D' rings and springs as shown. Attach pot. cable to control box.

(If possible c

Place electrodes on subject as shown & plug into 5 wire harness - to control box - recorded



Calib. - Displ. subject a measured distance while recording.

D & approximate ~~and~~ Vert. EOG cal. by having subj. look from one obj. to another a known distance apart & a known dist. from the subj.

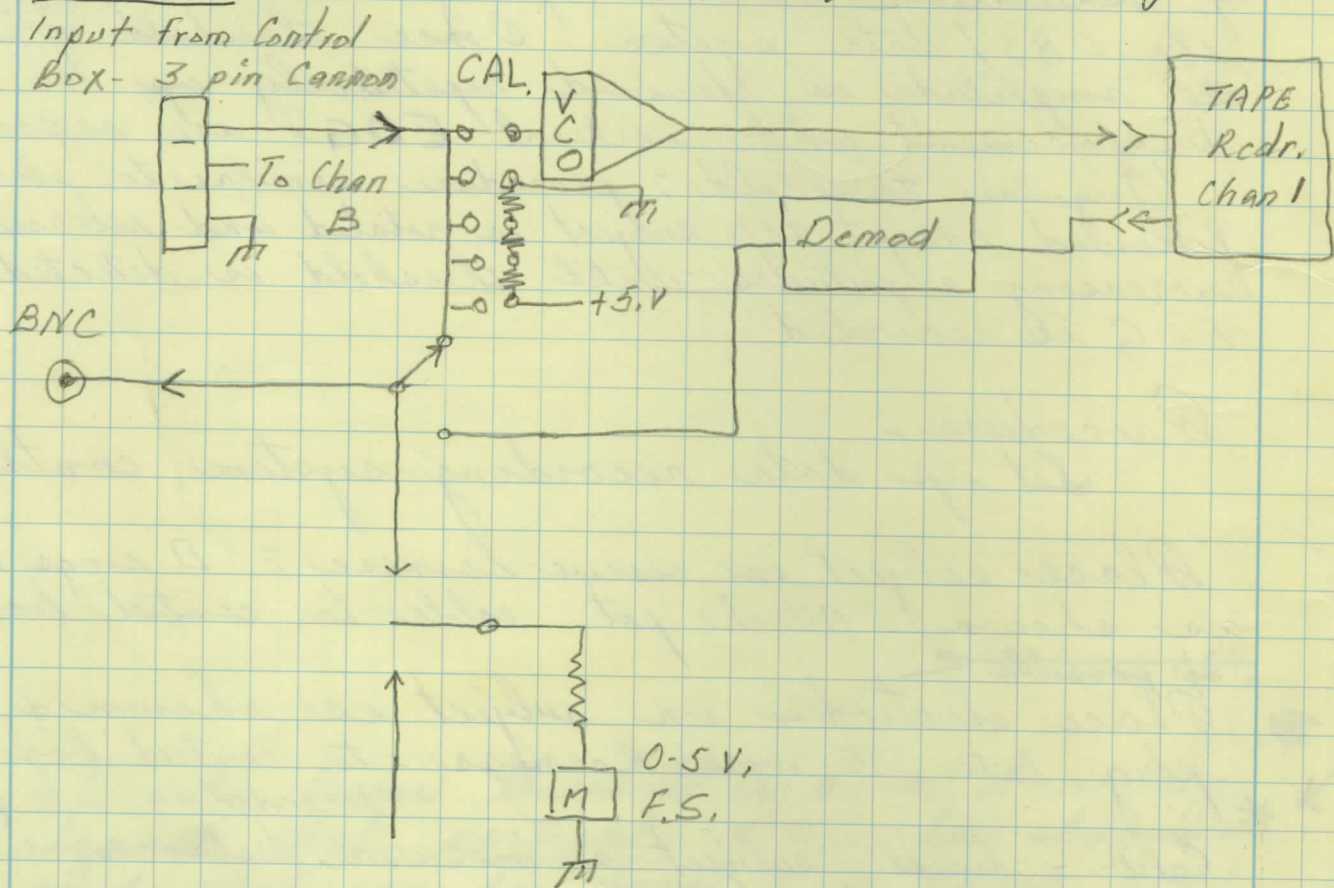
Place eye shade on subj. c ear occluders. Displace a small distance and release, allowing him to make 3 oscillations and asking him if he was oscillating. N.B. record any illusions such as tilts etc. record answer by one mark on data sys. for ~~no~~ & two for ~~yes~~. Use a larger oscillation to ~~avoid results~~

"bracket" threshold and then ~~up~~ reach threshold from "above" & "below" by successive decreases & increases in amplitude.

Once a reliable ^{threshold} amplitude is reached to successively double this until max. is reached and attach head pat.
Rotation - Switch EOG to horiz. and repeat above procedures in rotation.

If possible repeat EOG cal. after procedure.

Set up of data interface for recording on
SONY -



7 Jun S-7 Baseline

0930 To 1g tnr./air brg. - Tg.

Set up springs, sled cCB; A.C. EOG Vert., Data Recorder on air brg. and demonstrated equipment - Ran T/M after Tg set up but all false positives, then good run on Tg - Thence to 1G where OK drum was run c H EOG A.C. & drum speed -

Thence to audio lab where audiom. was run using 'old' data ^{for noise (pre-5-6)} and did thresholds and evoked pots. c shielded Xducer., log. clicker, flt. amps, etc.

Reduced tape data - S. carrier sys. was outstanding. AEP was O.K. but need 'quiet' data on Tg & data on all others. O.K. drum worked well -

T hold audiometry below -

Audiometer SN-002 phone #2, sound chamber in audio lab - oval head set carriers.

		125	250	500	1K	2K	4K	8K	8K
db.	R - Quiet	0	0	0	0	0	0	0	
Loss	Noise	30	45	245	35	25	5	10	
	L - Q	0	0	0	5	5	0	5	
	N	25	35	30	20	15	5	5	

Ex. Pot. Data - R+L ear lobes & fore head

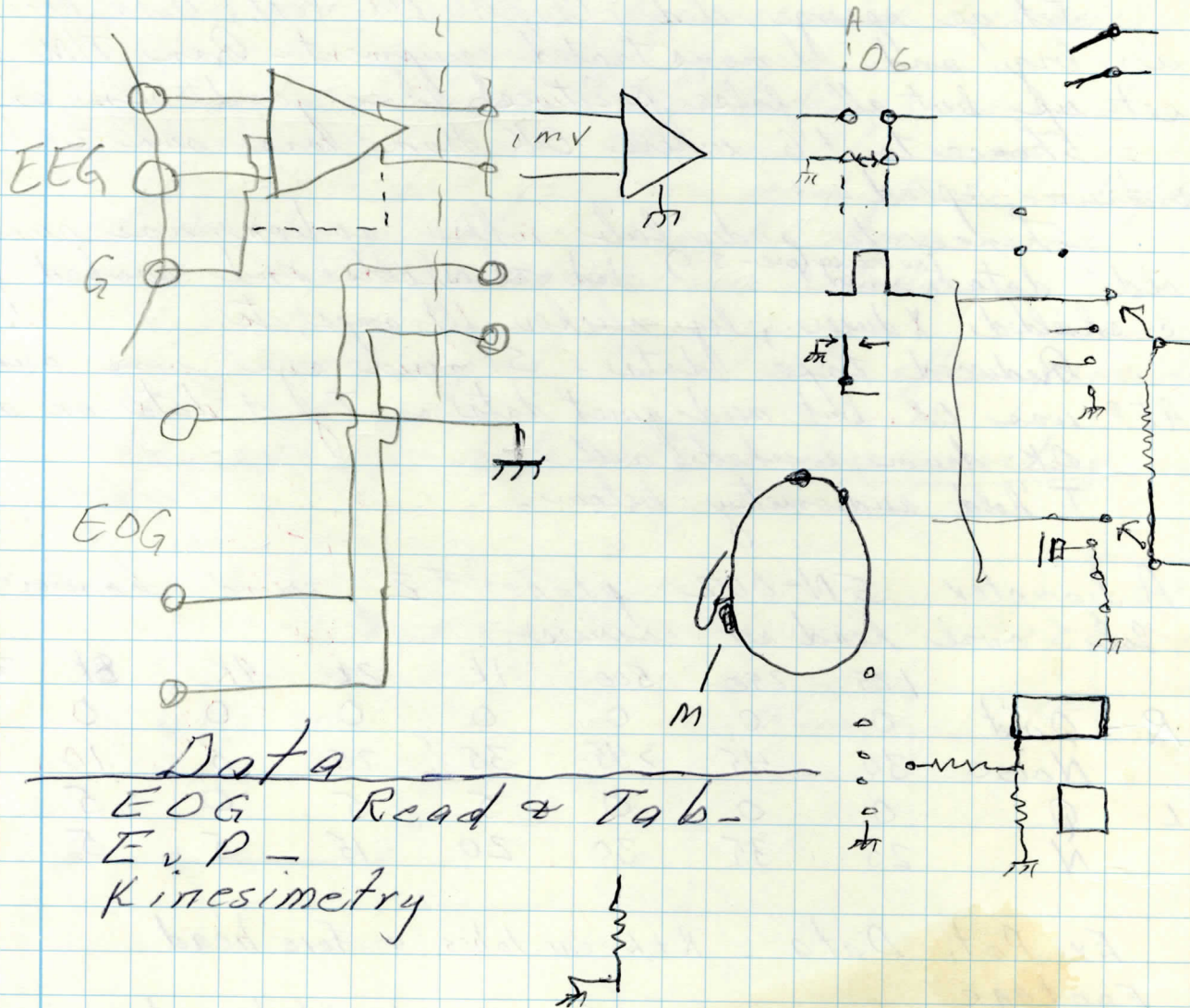
Footage

0-30	Posn I	Ⓡ ear	shielded Xducer
30-50	II		↓
50-70	III		↓
70-108	III	Ⓛ ear	↓
108-125	IV	↓	↓

Audiometry (at home by Tg's wife) 11.6.83

		125	250	500	1K	2K	4K	8K
R	0800	5	5	0	0	5	0	5
	1109	05	010	05	05	5	5	10
L	1109 0800	00	00	00	00	5	5	00
	1109	5	5	0	5	0	0	0

8 Jun

Monitor, Ambulatory
RecorderData

EOG Read & Tab-
Ev P-
Kinesimetry

1200-1800

Tg

SMS

P-III

Cal. c gauge

Ⓛ arm-

HEOG - 447 - Start ~ 1300

EEG 447 - + Ⓛ for. - Ⓡ mastoid Gnd-Fork-

MIT - P.M. 650=0 Probe-Z R₂ Lat Check
200 BVP 33.3°C

Transfer BP load to chip.

S-7 BP Monitoring Procedure

Install battery -

Attach 3 Electrodes, (B), to chest, after dry wiping, over apex of heart, V-5 L, Xiphoid & V-5-R or over ~~sternum~~ sternal angle -

Connect to EKG lead, red to apex, grn to Xiphoid & white to remaining, plug lead in Pressurometer (P-III)

Palpate Radial artery to ~ 3" above elbow and attach Sensor over this loc. & stoma seal doughnut -

Place cuff on arm & secure snugly such that bottom edge of cuff just covers sensor -

Plug cuff & sensor in P-III & turn on $\bar{c}$ selector, in 7.5 posn. - manual/recycle CK operation by pushing button and observing

If satisfactory push red button thru hole in bottom of case & note & record time - Do not turn unit off until meas. cycle is complete following this -

Calib -

Place P-III in test position

Attach bulb & gauge to brass test fitting on P-III (You now control leak rate manually during read cycle & bulb leak valve - close valve during pump up)

Place stethoscope over a/c fossa (do not move or jostle cuff during read cycle or it will be recorded)

Manually actuate cycle (manual recycle) and when ~~the~~ pump stops, take B.P. as you normally do controlling bleed rate $\bar{c}$ bulb valve.

Cal- BP contd. (Sample Time)
 Turn selector $\wedge$ to 7.5 & remove ~~the~~ cal.
 connector

*

* Data Storage - such that 200 line, 72 hr. limit will be exceeded
 transfer

65,531
 DT 4

If BP unit is used again, ~~remove~~ &
 store data as follows - N.B. After use leave PDI
 battery in place & machine in standby.

Place chip in ~~green~~ Data Transfer
 holder & clamp -

Conn. to P-III (green 'C' light comes on)

Push 'I' side of rocker switch

& wait .35 sec (green L light comes on dimly)

Remove & store chip

D/C Data Transfer

N.B. with battery in P III up to 200 lines
 of data will be stored for > 1 wk.

* Once time is reset unit will log data for
 72 hrs i.e. machine may be stopped started
 or continued at slow rate for 72 hrs -
 A total of 200 lines of data (Time, BP, HR)
 can be stored in this period.

Data System, On board recorder
General - Unit is a wide band FM system which stores 2 channels of data on stereo cassette tape. Input signals are 0-5 volts and output is 1V, but inverted. An integral calibration and meter for D.C. levels are provided. Batteries operate the unit for and may be repl. in flt.
Operation

Attach; 3 pin cannon to control box O Scope outlet, line in & line out ~~to~~ RCA plugs to SONY recorder connectors, color to color - , two BNC outlets to channel 1 & 2 on scope.
 Turn data sys. on

Turn recorder amplifiers on by either pushing only record or pause then forward & record - Set recorder meter levels at 0 Db.

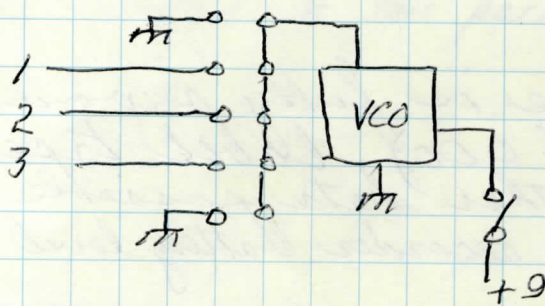
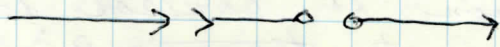
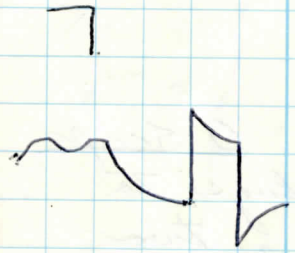
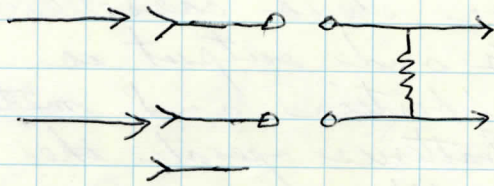
At this time operation of data system may be observed by adjusting scope and setting Meter switch to Channel A or B and swinging Cal switch through its range - N.B. output is less than input & inverted.

Calibration

Before tape is fully rewound, push footage marker (000), label tape c D:H:M, procedure & any other data possible. Also log tape separately - Ch. recorder battery level c its switch/meter.

Start recorder and turn calibrate switch through its range leaving it at zero & full scale for 10-15 secs.

Data recorder



9 Jun. S-7 Baseline

BP memory failed yesterday after successful X'fer. of prev. data load - Tried to trouble shoot $\bar{c}$ D. Squires but will send 1979 + PIII's & data transfer to DMA this AM.

Height meas. device jammed again yesterday & Whim. is on leave -

Hts. ~~Tripper~~ 5' 8 ⁹/₁₆" 1800 Havck

~~Havck~~ 6' 9 ⁹/₁₆" Fabian

10 Jun

Tgd.
EOG $\bar{c}$ SONY Storage

115

Cals

230

Head Turns EO

EC

Shields

Ad. Tgt.

slow Turns

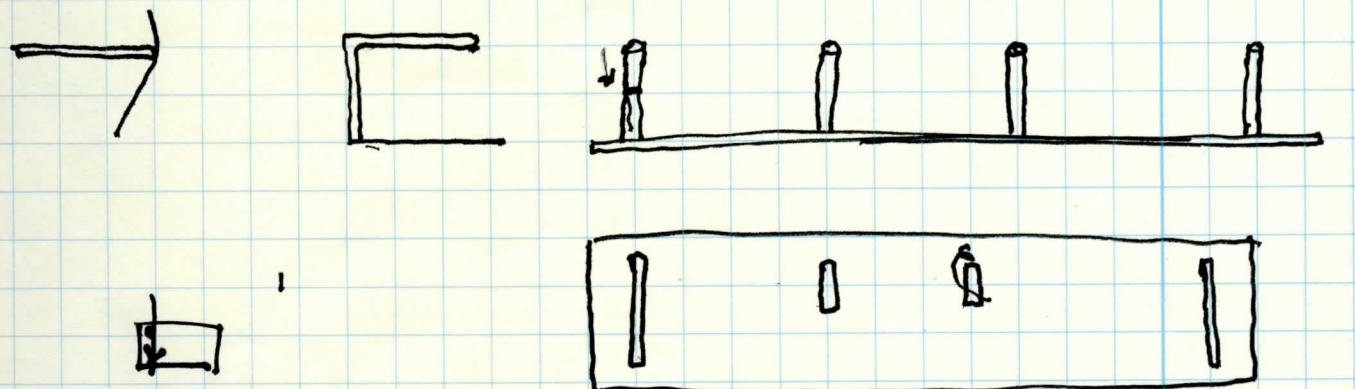
Gaze

OPK

Kinesimetry $\bar{c}$ Storage

Leg Photos $\bar{c}$ Leggins

Kinesimetry



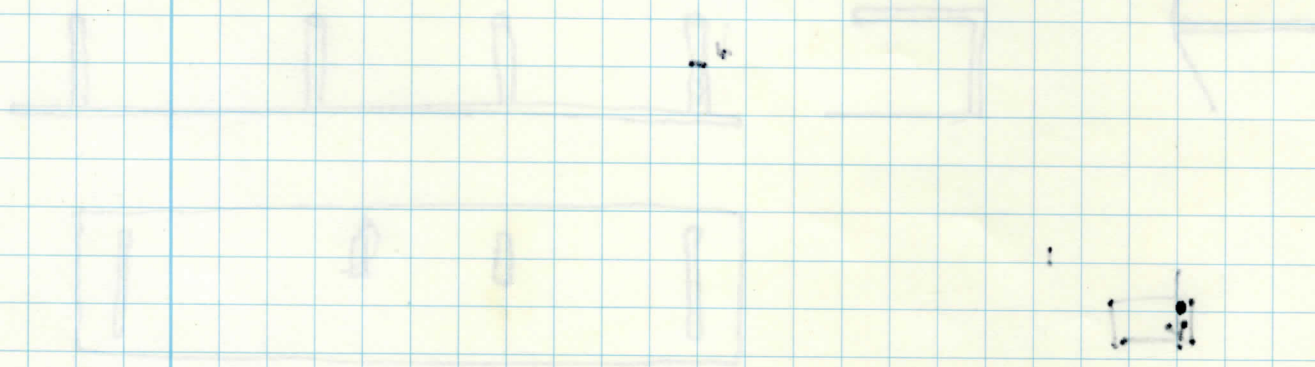
S-7 Flt Protocol Kinesimetry

1. 1 pos. static vertical, non visual Elbow
Loaded + unloaded Shoulder

Vertical dynamic, two ranges
C + S vision Elbow/Shoulder
Loaded + unloaded

Horiz. static, non visual Shoulder
Loaded + unloaded

Horizontal, two ranges
C + S vision
loaded + unloaded



EOG Procedure, 5-7 Flt.

Try to perform in low light levels.

H. EOG electrodes, D.C. Amp., Cal. lights, Pantograph POT,
O.K. Drum, Sony data system

H. & V. gaze

Eyes open; closed

Center, Right, Left, Up, Down If possible mark up, down

~~Eyes~~

← Calibration

9 Jun. Hdw CK -

DC Amp 51N 1002

Soltec	Gain	mV _{in}	V _{out}
V _{cal}	.5	+ 1.00	.409 426
HP		- 1.	- .503
3465B		+ 2.	+ .979
		- 2.	- .999
		+ 10	+ 4.934
		- 10	- 4.960

NB -

Soltec
had

⊖ -1.007mV

⊕ + 0.003"

Limits - 6.V

10 Jun -

Went thru H. Accel. Sens. & Tg.
Also Kinesim. & A Ev. P. in
1 g tar.

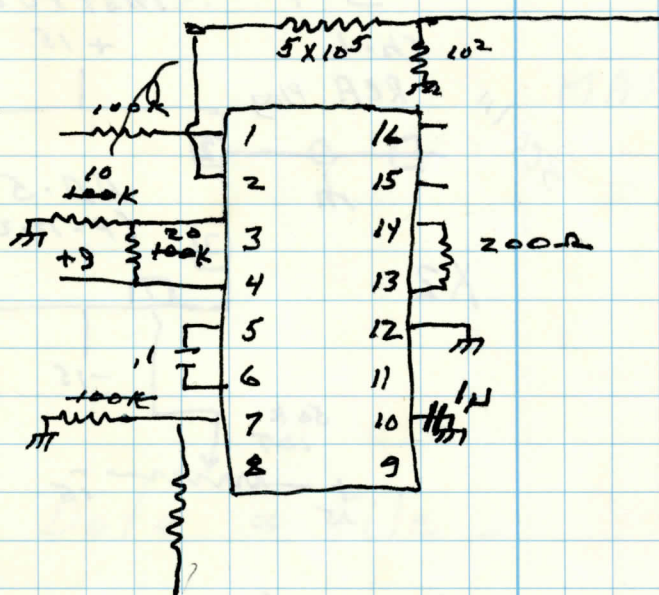
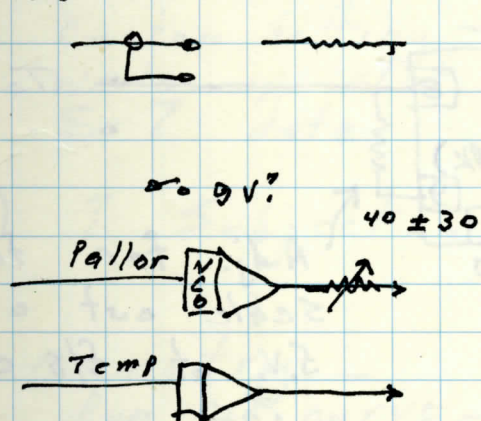
Squires finished P111 + 1979
+ shipped to arrive tonight.

Jim (Whm.) finished height
meas + will ship also tonight

Gave every item a funct. ck
Found bad switch contact in CB,
Bad battery in SCO + bad scope
cable - Blown (?) fuse in Scope
battery

11 Jun Republic A/.

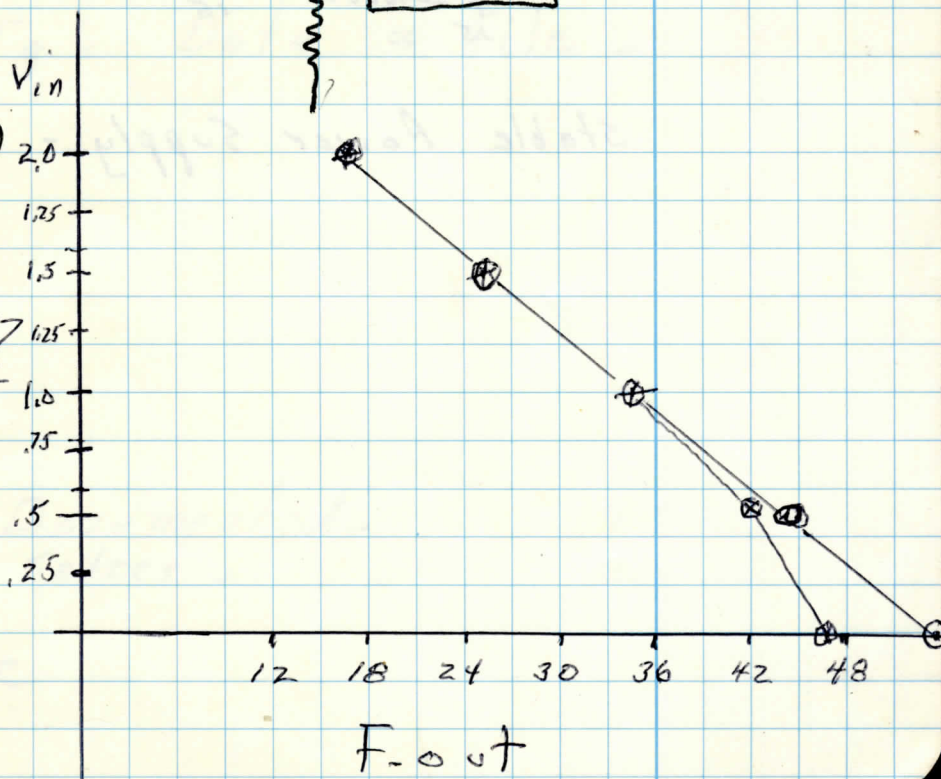
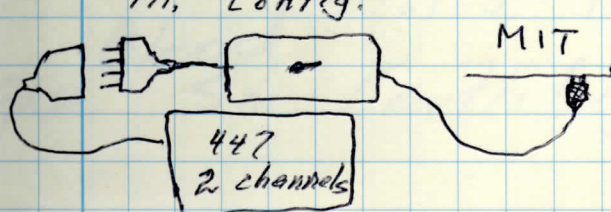
11 Jun MIT recorder

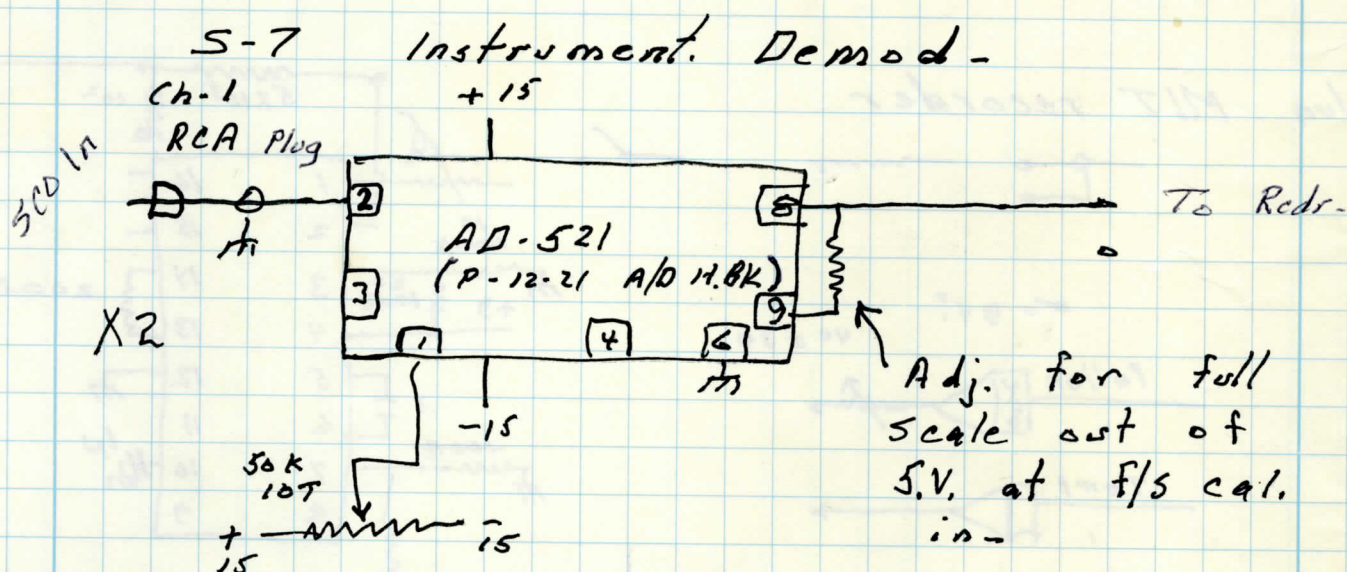
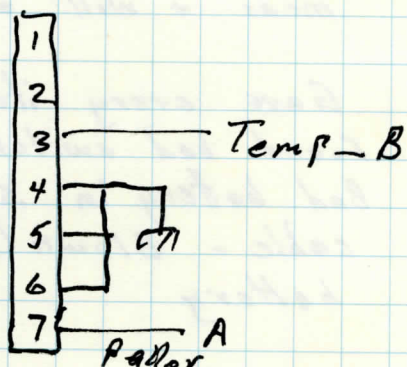
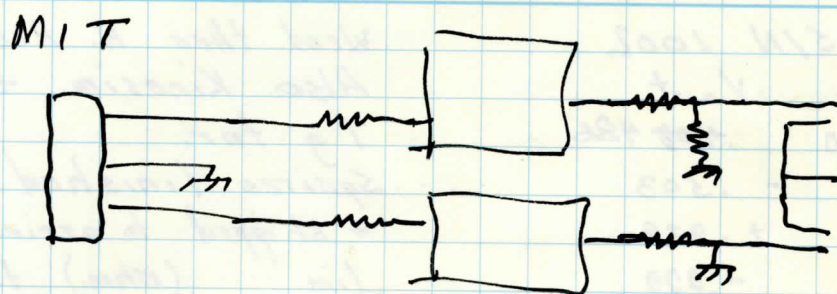


$I_{tot.} = 17.5$ (both 2206's)

Temp	Freq Hz	Δ	Pal
0	52	8	47
.5	44	10	42
1.0	34	8	34
1.5	26	10	26
2.0	16		16

'FH' Config.





Stable Power Supply - A/D 904 if readily avail

Leggings, S-7

Prime stocking.

Change stocking tapes
PM/AM markings, Mon
& Pers

Carry Prime to Cape Ties & Stow -
Tomometer " " " " exchange

Tom's Proj's.

Leggins -

1) Verification of repeatability.
" " absolute accuracy (vol.)

TM 1) | 4 sets meas. of TM
2 " " " 2° indiv.
3 base lines
Custom fitting -
Write up stat. &
S-7 data

MARAK

2) ? Subjects.

Tomometry -

Run Cat curve -

Document Tg's Data & File -

Eye/Hand -

Spross
Whm

Photography - Documented -
4 of 5 - to Selzer.

Blood

Spross

Sm. Centrifuge

11 June '83 -

Finally rec'd. P111 + 1979 - Immed. wore P111
which functioned normally & dumped normally to 79
Will get AEP tomorrow & finish pre pack.
Writing procedures -
Will try MIT unit tomorrow -

start	Cal. Scated-	1832
1632	AUS	P111
	112/74/70	116/77
	114/78	114/78
	114/78	115/81
	119/80	115/80
	117/81	119/81
	121/85	117/85
	121/79	118/82

12 Jun Cont'd C/O of Flt. Hdq -
Tg. did 2 AEP's at home PM &
I, III = Lobe AM c good, records R & L I & II, III & IV
to Vtx Also did Thold. audiom AM & PM + stocking -
II, IV Lobe to Lobe

June '83

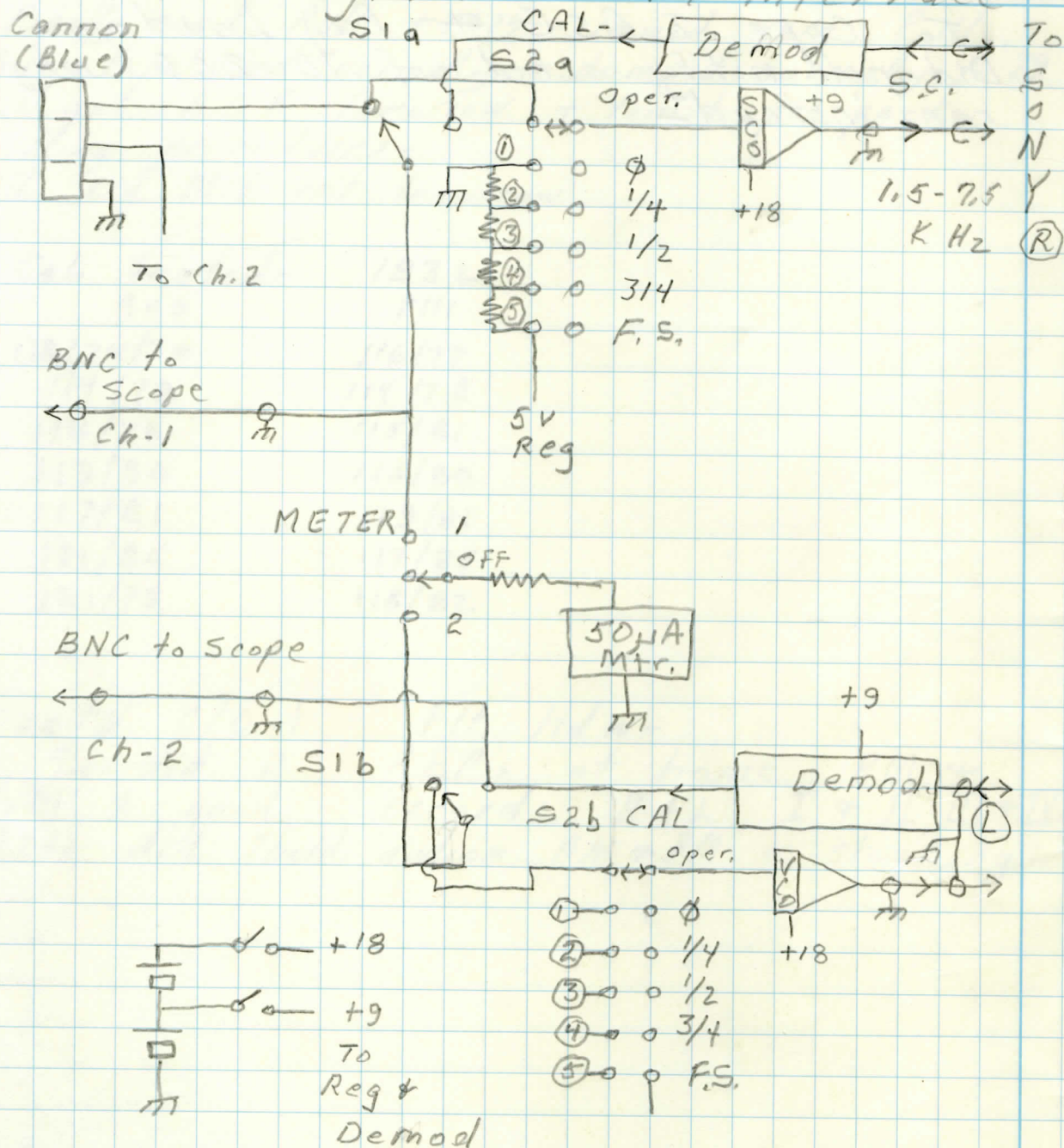
21

14 C/O S-7

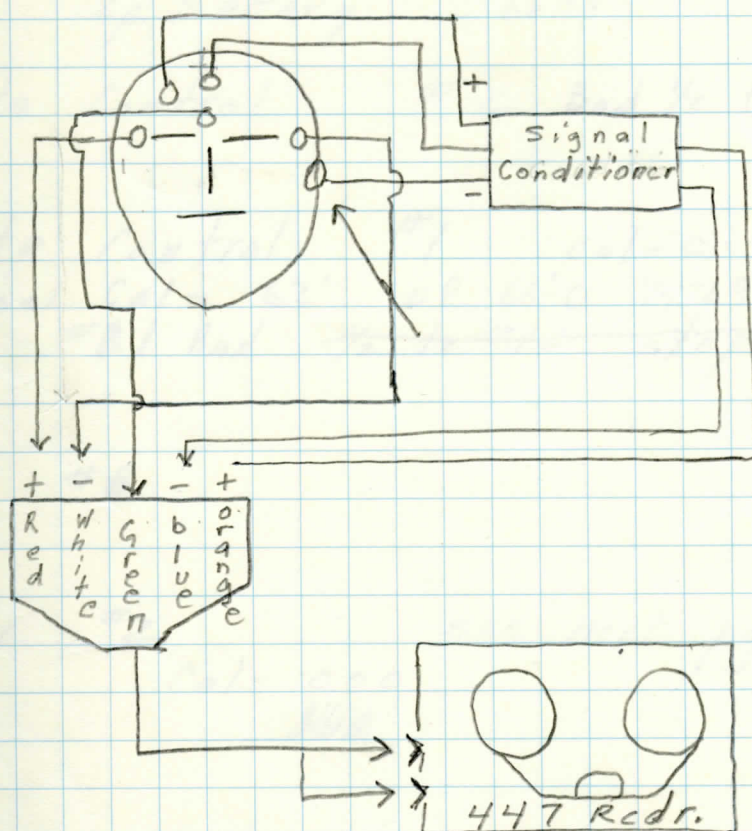
To Cape & GSE & Pay Load-

Did not notify sched. of 10-1200 mtg. Tg who
ran instead-

Block Diagram - Data Interface



Ambulatory Monitoring - EOG & EEG



Ambulatory Monitoring -

15

Batt.
Cover

Final Flt. Gear CK -
Scope & Battery conn + operated nominally to both
Sp. Battery batts -

Data Control #2 Bad 1/2 to

Data Control #1 cal-0.46 1/4-51' 1/2-53 3/4-56 FS-58
Final Cal- 62' OP 66-0 1/4-69 1/2-71' 3/4-73' - 75-FS
C/B #1 Bad 1/2 to 3/4 step step 82

#2

Rcdr. #2 see next pg-

Cal-000
~~000~~

$$\begin{array}{r} .7 \\ 5 \overline{) 35} \end{array}$$

$$\begin{array}{r} 55 \\ 5 \overline{) 275} \end{array}$$

$$\begin{array}{r} 35 \\ 5 \overline{) 175} \end{array}$$

Data Control #2

Cal #2 - FS Volt. 4.98 3/4-3.48 1/2-2.76 1/4-1.75 0-0

Recorded on tape 000-89

Res-String Wrong - in Calib.

F₀ KHz (L) (R)
0 8163 8073

1/4 5785 5745

1/2 4400 4388

3/4 3407 3416

FS, 1349 1399

Control #2 - Amp 168 - 162 (chgd. - From Doerr)
Set Amp Gains to & recorded -
1 mV. Calib.

17

17

Final CK -
Prime ~~CK~~ Cal light - 001

14
13 1/2 13 13 13 1/2
13 1/2 13 13 13 1/2

B/U 002 Ser. N. 002 had bad Cannon plug - 1 pin pushed in - replace conn. by splicing cable to prev. flown plug -
CB #002 Launch

All Lights
All Posns
Recorded

Gain Set - $\frac{33}{20} \text{ V/mV} = 1.65 \text{ K}$

D.C. Amp, 001 harness SN - 001

Zero & Gain CK all Gains -

D.C. Amp 002

Kinesimeter -

CK'd, Recorded -

Data Box 001

D/C Sig. Conds p test -

Record from all Sw. Posns.

Gain = $\frac{28}{20} \text{ V/mV} = 1.4 \text{ K}$
H & V Amp,

Tape Recdr - 1

Ran AEG on this & replayed -

Tape Recdr 2 - Ran SCO & AEG (see Below)

Audiometer #001 + 2 phones

All Freqs.

CK'd Audibly

BPR (PIT) & all sensors, coss & 2 batts CK'd.

Batts. charged for ~

Calib. SONY #2 -

10 + 10 -20 db MIC ATT AEGA-I

Click-1 82-89 AEG #1 - C-1 110-115 C-2 115-120 Sp. Click #1 96 to 105

1-89-96

AEG #2 C-1 130-140 C-2 121-130 " 105 to 110

SONY #1 C-1 C-2

A 2

C 1 150-160

C 2

160-170

K5C

Loaded erased chip
to PIII $\bar{p}$ pushing reset

Fit 447 -1mV - Pre Window

MIT - 4.5 + 4.5 ~ 0 } 0:10
T - 3.13 - }

Temp. cards in Telescope slot

Goggles & phones

Kinesim. Sig - & Photo jig.

OBS under electrodes in 1

Pantographs

CKd. Screws tightened.

#1

Cal - 100 - 6.5 div $\times 5 \times 10^3$ V.

Scale &

5 pin harness &

electrodes in bottom 2

5 pin harness & electrodes

MIT bottom Tray 2 & elect.

Spare Spare EEG - Top 2 &
conditioner

AEP2 Prime Xducer & heel cup

5 batts & headphones

O.K. Electronics.

Recorded on Graphic Recdr.

SPL - Lin Oct -

Crown p trs

Calib. & B+K 4230 1K 93.8 db. 992053

SPL-meter - B+K Model 2215

31.5 51 $\leftarrow$ Db SPL.

SN - 970179

63 40

125 32.5

250 26

500 23

1K 21

2K 17

4K 12

8K 12

A - 25

15 Jun CK of Launch Equip.
 C.B. - All posns & Lights -
 Recorded all posns - graphic rcdr.

447 #1775

start at Window Time 7:05 PM

1 mV both ch.

1 mV - Ch 1

Gyro Ch 2 - 7:07

Head turns & Gyro 7:08

500 007 7:10

MIT MON "

on Palm T84

7:13 Pal - -4.5

7:14 - 0

7:15 + 4.5

7:16 0

7:18 raise arm

7:18 Vals -

7:19 - 4.5

7:20 + 4.5

Temp + 35.1%

MIT

Not Conn.!

P -

T

7:20 - 0

:21 - 4.5

32.5

:22 + 4.5

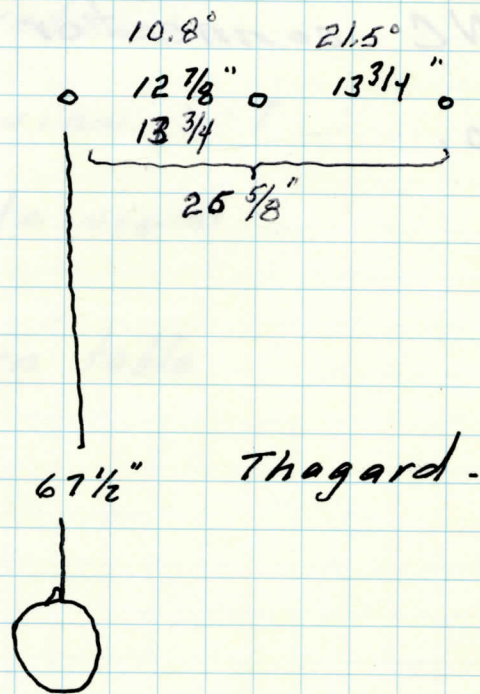
Launch - Rcdr. 1776

1 mV Cal both ch -
 before to Window

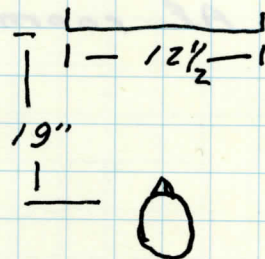
June 1983

18th

Launch 169:11:33
EOG -
Calibration Config.



Fabian



N.B.

19 May
1984

EOG Launch Data review -
MS-3 Apparently Head Pot was tilted for gains
are $\downarrow$ high - 2-3x expected -
Probably not safe to compare EO gains dur-
Launch but EO:ES + iEC might be.

MS-1 Gyro and

18 Jun S-7 Mission

Launch -

Tg. did two complete EOG's prior to L/O
Rcdr. on L-2 thru L05AOS DAK - near end of run $\bar{c}$ eyes shaded & calib.

Quick look -

Cal. Nr $\oplus$ Nr $\oplus$ Fr $\oplus$ Fr $\oplus$

Last

Prior to L. Dakarend

8 1/2

7 1/2

17

14

H.T. EO-E

H

E.C. E

H

E.S. E

H

37

38.3

6.5

~~38.3~~

21.75

Cal. Pot - $170^\circ = 90 \text{ div.}$ or $1.889^\circ/\text{div}$ $\leftarrow$ Nb. also confirmed on
Kinesim $149:22:86$ $90 \text{ div} = 12.5 \text{ ins.}$ $90 \overline{) 12.5}$
 $139''/\text{div}$ $90 \overline{) 170}$
 90
 800
 720

Kinesim -

static Unload-elbow - loaded

Initial - 42 drift to 43

50 7

36

49 6

37 $\rightarrow$ 36

49 6

42 6

53 10

47 11

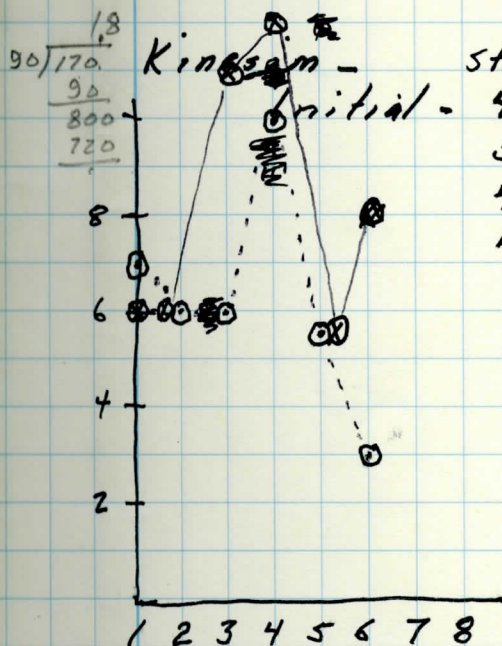
48.5 5.5

48 12

46, 3.

41 $\rightarrow$ 42 5.5

44 8.



18 June
19 15

Evoked Potentials

We assume you tried the spare preamp & cable
To aid us - what were the results
of the mic Attenuator in 0db.?

If Posns. II & IV Function record from them, then -

Earphone on @ ear, Posn. II
Red - lead R ear
Green " on Vertex
White " " L ear

then Earphone on @ ear, Posn IV

Green lead on Left ear
Red electrode on Vertex
White " " Right ear

Above msg. in response to Tg's. msg. that leads I & III weren't working on AEP -

D A T A - Flight

18 Jun

Prelaunch

Lift 11:33 Z -

11:29: Launch 2° Roll from KSC no time Code - to 1° LOS BMD

69:11:40 JSC -

11:51

On Orbit - Day 1

169 5:22:16:30 Kinesimetry, - V. elbow, shoulder static + dyn. loaded + unload. MET-0:11:XX
AEP - ? probs - did not complete - electrode hor. - stat. + dyn. + UL
Day - 2

170:11:11:40 1° EOG Tg - Drift, lost Head turns - Good OKN MET-0:07:7hr
:11:25

Ran PIT (SONY Rec.) D.C. Amp

Ran Tg AC ?

HT - 22 hrs.

AEP normal Tg only?

01:06:45
2° Day 14:15 EDT

Day - 2

Ran PIT EOG

Day - 0330
1 day + 20 hrs.

Tg EOG

MS-3 EOG Gain

E/O/H	ϕ	τ	E/C	ϕ	τ	E/S	ϕ	τ	E ^s /E ^o		
1.145	.02	+12.8	3.70	1.33	.01	12.3	3.64	0.970	+13.5	3.57	0.85

9 Jun -
16 Tr 7.

Pre Launch 1.276, .09, 33.7, 3.53 / 1.653, 27.5, 3.55 | 1.452, +23.6, 3.60 1.2

Dakar

.94

	Date	Preflt.	Tg	AEP	Digital					
					1	2	3	4	5	6
10J-1.	~5-23'	I	Ⓜ	~1024, 512, .2ms, .001 LF	Dolby	On	.90	1.41	1.93	2.51 2.93
2	5'-23'	I	Ⓜ	~1024, 1024, .2ms, .001 LF. $\pm 1/4$	5X		.83	1.36	1.91	2.44 2.93
3	23'-68'	II	Ⓜ	2048X, 2048 .2ms, .001 LF $\pm 1/4$	5X		.83 .72	1.39	1.90	2.43 2.92
4	68-91	III	L	1024X, 1024 0.2ms, .001 LF $\pm 1/4$	5X		.84	1.32	1.78	2.41 —

P Flt. Comments 24 Jun.

Rick

TPR - 97.8

126/80

5X

p-54

↓ Bowel Sounds - ↑ pupils - blurred vision
No Nyst., Comazine -

-6

Tg Audiogram - last days -

ABP - → Quit, p 6 hrs - sw on - next ^{day} malle - Xfer -
to chip c label

Tg - 126/80 - 72

Photos -

Day - 3 ~~105~~ All -

101.22

Rep on Tg

T/M all but Tg - Photos of TM 16 + 35 mm.

25 Jun

Heights ?

Tonometry - done on Tg -

Plethysmography - 2X day

25 Jun /n flt. Data (Tg's N.B.)

Day 1 -

Tg. EOG - D.C.

MET

0

0:07:+

Kinesim.

0:11:+

Plethysmog.

0:11:410

Tonometry

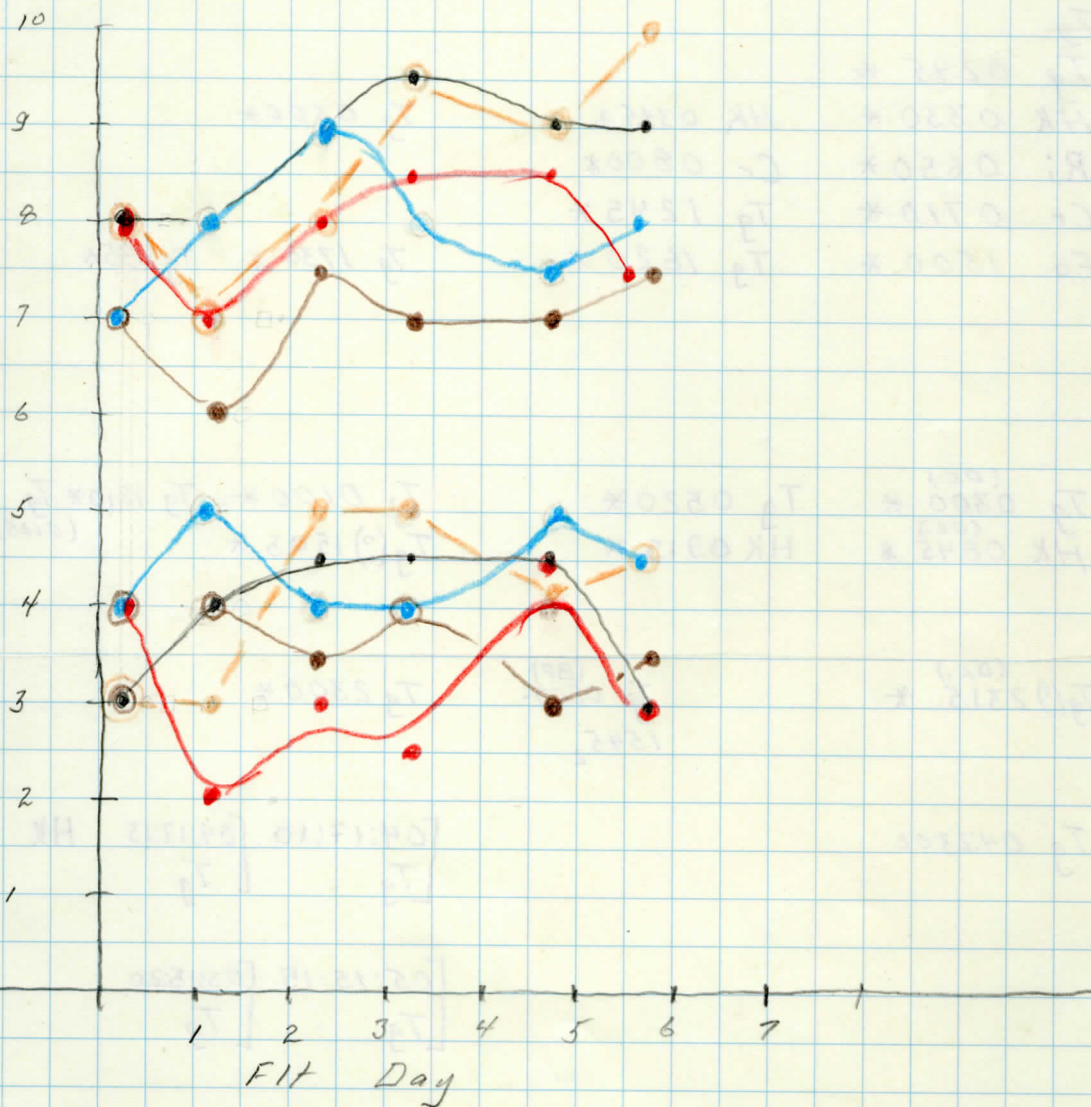
0:11:415

25 Jun In Flt. Data (Tg's N.B.) Summ-

<u>Photo</u>	<u>EOG</u>	<u>AEP</u>	<u>Monitor</u>	<u>Pleth</u>	<u>Ton.</u>	<u>Ht.</u>	<u>Audiom.</u>	<u>Kines</u> <u>Altki</u>
Day 1-	Tg. 07:00 (pc) IA			Tg: 11:10	Tg: 11:15	Tg HK Ri Fa Cr		Tg: 11:15+
Day 2	Tg 0715 EDT, Fa 1130 " Tg 1500 " Cr 1630 " Tg	Tg 1415		Tg: 04:00				Tg 1530
Day 3	Tg 0245 * HK 0330 * Fa 0535 } Hd + leg } Ri 0640 } Hd + leg } Cr 0725 } Hd + leg }	HK 0345 * Cr 0800 * Tg 1245 * Tg 1620 *		Tg 0500 * Tg 1730 * Tg 1735 *			Tg 1415 * →	
Day 4	Tg ^(D.C.) 0300 * HK ^(D.C.) 0845 *	Tg 0520 * HK 0915 *		Tg 0100 * Tg (?) 1505 *	Tg 1510 * (0105)			Tg 0330 * →
Day 5	Tg (?) ^(D.C.) 2315 *	Tg ^(BP) 0800- 1545 ₂		Tg 2300 *				Tg 1530 * →
Day 6	Tg 04:23:00			[04:17:10 Tg	[04:17:15 Tg	HK		Tg 05:04:05
Day 7				[05:15:15 Tg	[05:15:20 Tg			

25 Jun '83 In Flt. Data- Tg's. N.B.K. - Tonometry

Assume Launch was 0730 EDT	Time(MET)	Biceps		Triceps		Thigh(A)		Thigh(P)		Calf (relaxed/contracted)	
	MET										
	0:07:00	8	3	7	4	7	3	8	3	8	4
	0:20:30	8	4	8	5	6	4	7	3	7	2
	2:10:05	9	4.5	9	4	7.5	3.5	8	5	8	3
	3:08:30	9.5	4.5	8	4	7	4	9.5	5	8.5	2.5
	4:17:10	9.	4.5	7.5	5	7	3	9	4	8.5	4.



05:15:20 9 3 8 4.5 7.5 3.5 10 4.5 7.5 2.5

25 Jun S-7 Flt Tg's N BK, Height

Time MET	Tg	Height, Ins.-			
		Cr	Fa	HK	Ri-
0:12:00	5' 8 $\frac{3}{8}$ "	5' 10"	6' 1 $\frac{3}{8}$ "	5' 9 $\frac{3}{4}$ "	5' 4 $\frac{3}{8}$ "

2:17:30	5' 8 $\frac{3}{8}$ "			5' 8 $\frac{3}{4}$ "	
---------	----------------------	--	--	----------------------	--

4:21:00	5' 8 $\frac{5}{8}$ "				
---------	----------------------	--	--	--	--

Post

6 July 1200

5' 4 $\frac{1}{8}$ "

25 Jun Flt Data, S-7 Tg's N.Bk. Vital Signs

<u>Time</u> MET	<u>Subj</u>	<u>Temp</u>	<u>B.P.</u>	<u>Pulse</u>	
0:12:00	Tg	—	122/76	66	
0:23:45	Tg	—	122/76	66	
1:05:30	Tg	—	122/76	—	
1:					
2:21:15	Tg	—	122/80	64	
"	Ri	—	100/74	52	
"	Fa	—	120/80	52	
"	HK	97 ⁸	126/80	54	
2					
3:00:10	Tg (p emesis)	—	120/80	72	Eyes 3mm react.
3:00:00	Tg	99 ⁸	120/72	60	
3:02:00	HK	98 ⁶	—	—	
4:23:00	Tg	98 ⁶	—	—	



Launch - L - 1:05 51 BPM

H.R. 0:36 52

Fa 0:20 55

0:11 53

:07:30 52

:04: 56

:02: 54

:00:30 58

+ :03: 56

:05: 60

25 Jun Flt Data S-7 Tg's N.BK. Optometry -

MET	Both	R	L	
00:22:00	Tg 20.5	20.5	20.5	40 Y.O.
	Ri 15	15	14.5	
	Fa 44 YD	45 YD	44.5 YD	≡ glasses
	38 "	39 "	39. "	≡ bifocals
	Cr 15 cm	18 cm	16 cm	
	HK 3.7	3.5	3.5	dipters

02:03:30	Fa 24 cm	27 cm	28 cm	
	HK 3.8	3.7	3.6	dipters
	Ri 15 cm	16 cm	16 cm	

02:22:00	Tg 20.2	19.5	20.5	
----------	---------	------	------	--

04:07:00	Tg 21.0 cm	20.3 cm	20. cm	
	Cr 15. cm	17. cm	17. cm	

04:17:20	Tg 20.7 cm.	21.2 cm.	20.7 cm.	
----------	-------------	----------	----------	--

25 Jun Flt. Data S-7 Tg's N.BK.

EOG Details 1A

0:07: Tg- D.C. Amp. 30° R L C U C D } eyes open, closed 1A
 Hd. Turns R L C U C D } shaded
 Cal. Hd. Turns EO, EC, ES
 Tgt Trk
 Re Cal
 O.K. drum

0:22:00 Tg Amp. Not recorded on SONY
 Cal., Hd. turns, EO, EC, ES, tgt. track., cal., O.K. Drum ~~1A~~

1:04:00 Fa EOG's on SONY 000-122 (Label) 000-240 1B

1:07:30 Tg A.C. Amp. SONY 125-306 (Label) ~240 to ~455 actual 1B
 Wm DG
 Gaze R, L, C, U, D,
 Turns R, C, L, U, C, D
 Cal., EO, EC, ES, Osc, Tgt. Trk., Cal.,
 O.K. Drum

1:09:00 Cr 000-109 Cal., Hd turns ? Tape 2

1:19:00 Tg

1:20:00 HK 1:22:00 HK Comp.

1:23:00 Ri SONY side A 000-110

1:23:40 Cr SONY 110-288

25 Jun Flt Data S-7 Tg's. N/BK A.E.P.
MET
1

01:07:00 ✓ Tg I - 0-19 II - 19-34 III - 34-48 IV - 50-65
Clicker Vol. - 5

01:08:00 HK Clicker Vol. - 3(?)

02:00:30 Cr Clicker Vol. - 7

02:05:15 ✓ Tg I 0-16 II 16-32 III 32-50 IV 50-65

02:07:30 Fa Cal, Turns, Tgt. trk., recal, O.K. Drum

02:08:50 Tg D.C. Amp. Gaze R L C U D EO, EC, ES.
30° Hd. Turns R C L C U C D EO, EC, ES
Cal., Osc. EO, EC, ES, Tgt. trk., OK drum

02:20:20 Tg 75-145 I-75-90' II 92-109' III-110-126' IV 127-145' 6A T-99.8

03:18: Tg 110-188

6B

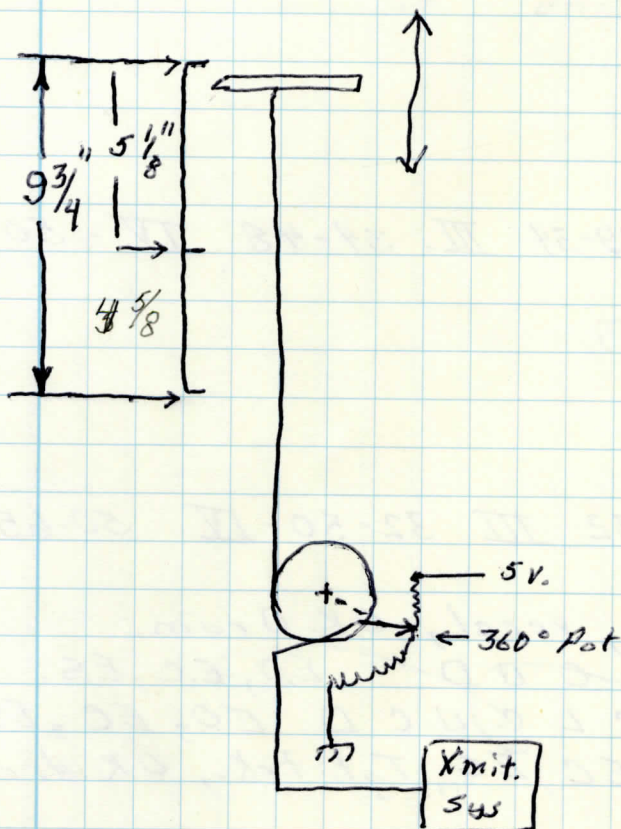
04:23:00 T

8A 98.6

23 May
84

Kinesesthetic

Meas.
today by
J.C.



29 May - James Measured, tabulated dynamic meas.
Made Plots of static & sm. dynamic & lge. dynamic ex.
horizontal

9.75	79 mm	.1234 "/mm defl
5.125	36 " "	.1424
4.625	36 " "	.128 " "

27 Jun Debrief

1

0800- MECO caused pitch down sens - Ri
 Can't reach switches on overhead during G's > 2.
 Don't deviate on C/L items - i.e. go by #'s
 1° 2-3 hrs. in W requires concentration to prevent untoward movements 2°-3° day is first
 HK- Strange sensations but no untoward ~~maneuver~~ sensations -
 Different opinions on seat restraints - Felt better strapped in
 Tg - No restraint on movements
 Sleep 26 hrs.

Crip - Cdr seat c lap belt - no shades

Hawk - Plt. seat 5 restraints - floated w difficulty

Tg - ~ 4 hrs. in bag

Fa - in bag x2, then

Ri - in bag then tried Free floating.

preferred Apollo bag Fastened

All had low back pain which improved

T/M Crip - 2-3-4 15 mins day -

HK 4- periods jogged c sox - 12 mins -

Tg - didn't use

John - 4x restraint questions

Sally - 4x, didn't use same
Knee bends -no changes
in physiol -

SAS:

Cdr - All did job - no subs.

Stuffy on day 4

HK 1/2 S/D p DMS 1 the 2 at 4 hrs intervals

Good 4 hrs sleep

Back pain

stomach awareness

Ducolax day 2 Comp. supp in PM

Day - 3 stomach awareness - tail first - ZLV -

Felt. worse.

Day 1 - occipital H.A. - slow onset of head fullness

No reentry phenom. dilated pupils

Was careful not to veer - had side slip phenom.

Back pain in kidney area cleared c movement -

Norm - Visual reorient - Full face 2 hrs, 'burning' Face 4 hrs -

5 hrs - motion sick - nausea that ↑, still ↓ SX, felt better

middeck - did like middeck - felt better in A.M.

3° day nlt until 3-4 hrs. No H.A.

Entry - whole body swung c head motion -

"weighed 350# p Plt. Overheat turns - No

27 Jun

Debrief

2

SAS - cont'd.John - $\frac{1}{2}$ Scop Dex - no other - no on orbit SX -

SX - from Hd turns & OKN - day 01:04:-

Repeat - no SX - on day 4

Force Fed. - Gas in stomach - On return to 1g.

Heavy - listed to (L) felt strong (L) roll -

Ride - no meds -

denied all sx until

7 $\frac{1}{2}$ - 8 hrs. sleepy - then no recurrence

low back ache -

No reax to OBS, OKN - disoriented on head motions

Ri, HK, Fa - no change in G level - immed. p flt.

perceived during reentry

Na loading:

All did but Crip. didn't use Na.

No one used G-suit

Noise level:

Not measured

No interference to normal speech!

Drinking H₂O:

Gas remains - < 10%

HK didn't like

Cold + ambient

Food:

Took meals together

Didn't eat all Fresh Food or bread

Space for ops -

Denied physiological effect -

Doesn't want to take over from auto land lower than beginning of final

27 Jun in Flt data Blood Pressure

1930 P III # 398 Xducer # Batt # 1241 -

Time 04:00:30 Thurs → Mon 4 days

Att. ~~match~~ dump box to 1979 $\bar{c}$ chip dumped in flt. reset '79

Dumped + replayed - few good readings followed by *'s
Then dumped P III to 1979 $\bar{c}$ ~ 7 hrs good records

Batt 1241 completely disch. repl. $\bar{c}$ # ?

Attempted 2nd dump - no joy -

To Fred Spross; fully charge batt. #1241 and disch. on recorder.

28th

27 Jun Launch Reentry - EOG
5N-1775

Good EOG record. Low amplitude noisy gyro -
Replayed at 2X amplitude -
Will add 1 mV cal. + gyro cals.

Analysis AEP

67

28 June Date	Tape	I	II	III	IV	V	VI	I-IV	I-V	Side Lead
-----------------	------	---	----	-----	----	---	----	------	-----	-----------

$\Delta T/V$

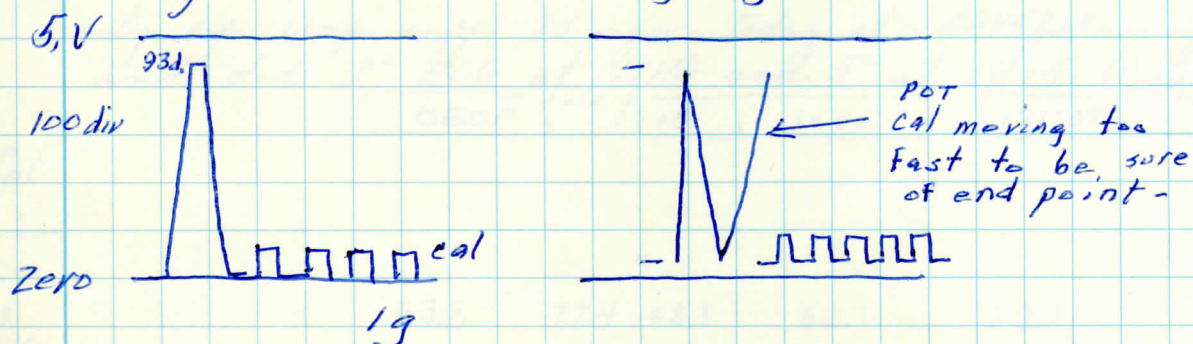
10 June	5-23	1.58	2.72	3.82	4.85	5.83		2.24	4.26	Ⓐ I
2230		1.43	2.77	3.82	4.87	5.85				Ⓐ II
	68-91	1.70	2.62	3.59	—	—				Ⓐ III
	91-111	1.64	2.90	3.86	4.96	5.94				Ⓐ IV

4/1/1

E O G

NB. large discrepancies in Eyes Open Gain - 1.0 - 1.4

No obvious source error -

Small zero offsets in D.C. level on in flt. records +
no good cals. to verify eg:

Although pot errors have been ckd. repeat $\bar{c}$ E.D. Hd. Osc.
today in chair $\bar{c}$ C clamps hold-ing bar for Pot clamp -
shifted pot R & L, front & back on Velcro. & then tilted pot
 $\bar{c}$ centered $\bar{c}$ head turns between $\bar{c}$ cals - POT cal = 93div./170°

Cal factor/%wt	Head	Eyes	Gain	Cond -
NO @ P @	46.6°	50.5°	1.08	Centered
.154 .154 .145 .1365				
<u>.1407</u>	41.6	47.2	1.13	Post. Offset
.148 .142				
<u>.1451</u>	43.4	48.9	1.13	centered
	43.7	48.6	1.11	Anterior
	52.4	48.3	1.09	Right offset
	56.3	49.5	1.14	Left "
	46.1	52.4	1.14	center
NR NR FL FR				
.143 .144 .140 .134				
<u>.141</u>	38.0	46.07	1.22	Tilt Right
	27.6	42.4	1.56	Tilt Back
	41.1	45.0	1.094	center
	41.5	44.7	1.079	center
.143 .153 .138 .145				
<u>.141</u>	46.6	50.5	1.083	Center
	41.6	47.2	1.13	POST

Center -
1.101 $\pm .027$ SD

5 July - Validation of Inflt. Data. PIT- EOG

Record inflt. during malaise was grossly abnormal. Subj. took 25. mgm. supp. Compazine day 2 $\sim$ and rep. on 3rd day 0500 while record was made 0300. To document med. effects subj. rep. Comp. supp. 25 mgm. today at $\sim$ 0845 following EOG at 0800 and did 2nd EOG at 1115 and 3rd at 1615. Results extracted below.

0800 ^{July 5} 1115 1600 171:07 ^{In Flt} (21) (21)

Init. Cal

Final. "

E.O.

		*					
Eyes	63.3	77.4	68.3	66.3	69.1	71.7	91.9
Head	60.2	69.3	59.2	55.8	52.4	47.9	57.2
E/H	1.05	1.12	1.16	1.19	1.32	1.50	1.6
ϕ	-3.8	-2.8	-3.7	-2.80	-30.	2.8	-5.3
γ	4.8	4.2	4.7	4.2	5.6	5.1	3.43

E.C.

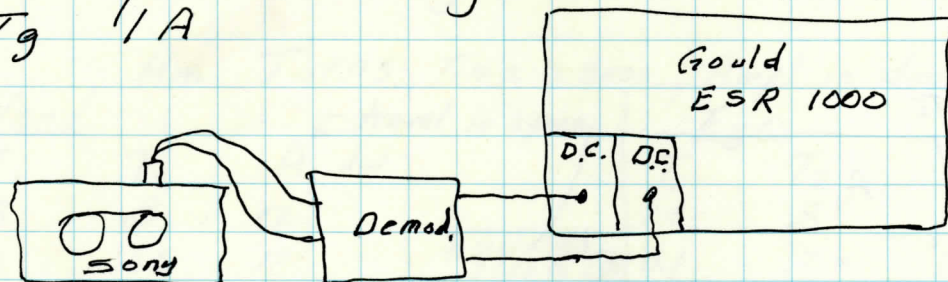
Eyes	83.4	99.3	94.1	98.1	42.3	48.4	44.9
Head	65.4	73.3	69.5	52.3	47.5	40.0	46.7
E/H	1.277	1.36	1.35	1.89	.887	1.217	.964
ϕ	-11.9	-5.8	-9.7	3.5	-38.	7.1	81.8
γ	5.5	4.3	4.6	4.2	5.7	5.2	3.4

E.S.

Eyes	59.0	68.3	48.2	55.0	40.9	46.7
Head	79.6	83.4	40.7	63.8	36.0	38.
E/H	.742	.819	1.20	.866 (656)	1.143 (762)	1.236 (.773)
ϕ	-8.2	-3.6	7.2	-60.7	4.4	3.1
γ -sec	4.8	3.6	4.5	4.8	4.7	3.5
		4.4				

*

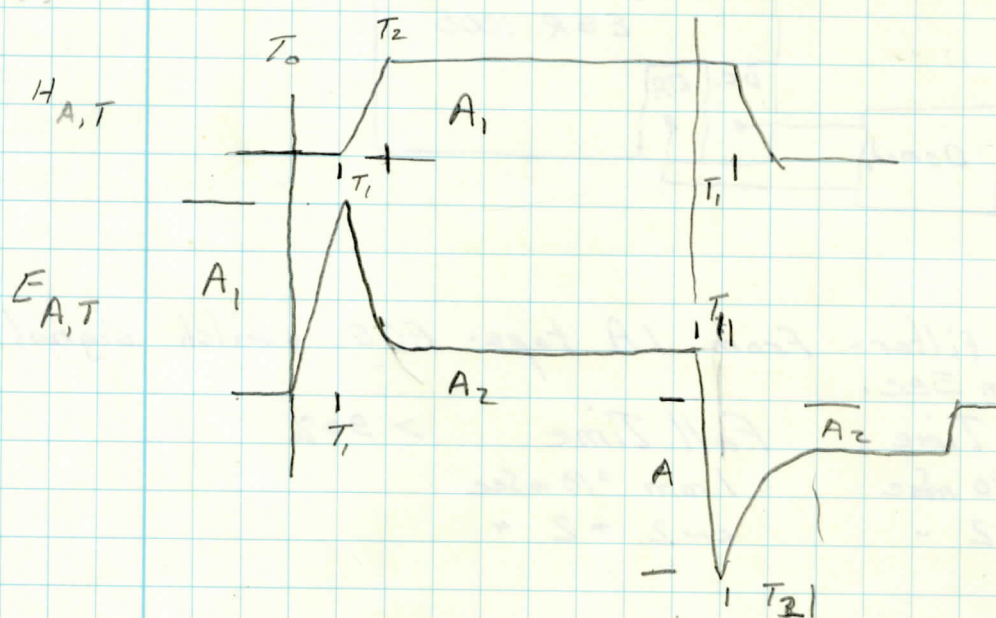
5 Jun 86

Graphic recording of S-T data -
T_g 1A

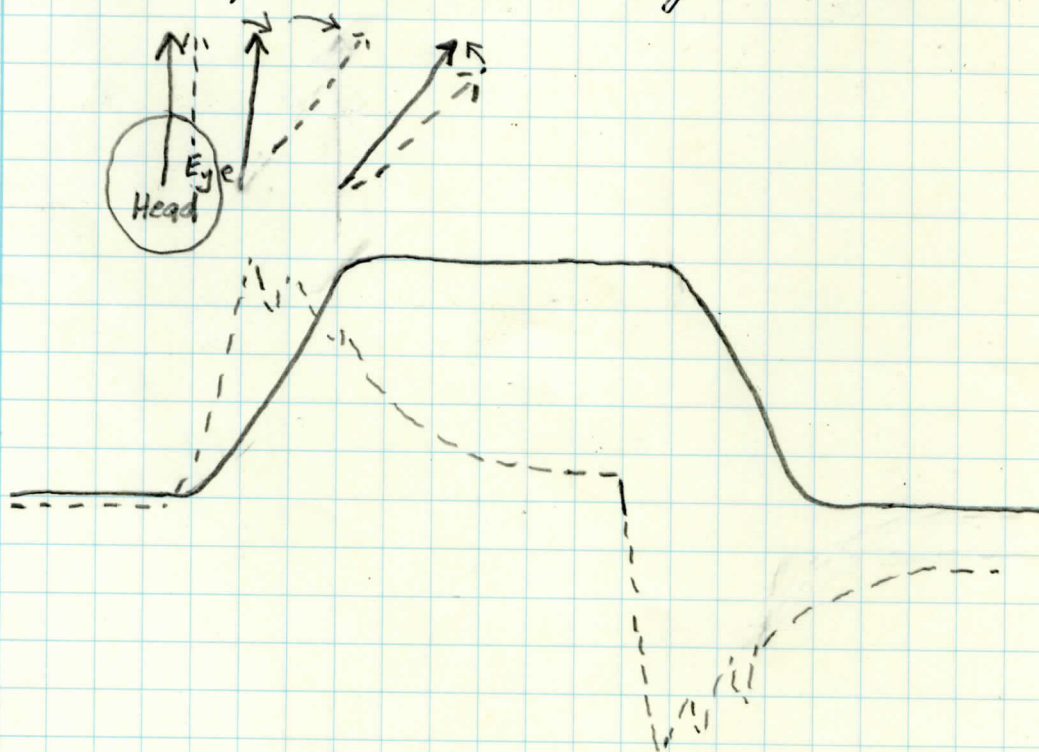
Response time of filter - From 1A tape - EOG switch signal.
100 mm Sec.

<u>Filter</u>	Rise Time	Fall Time	> 90%
IN	1 mm = 10 msec	1 mm = 10 msec	
OUT	< ~.2 " 2 "	< ~.2 " 2 "	

Hd. Turns



In making a general review of the launch reentry tapes I once again looked for evidence of abnormal eye movements (nystagmus, oscillopsia, etc.) and for changes in gain. I had never quantitated response times in the head turns but had noted on the first flt. that the PLT who was affected $\approx$ SMS had the appearance of $\uparrow$ gain on eyes-open head turns in contrast to the unaffected KDR. MS-3 on S7 had such increase in gain (based on response time) immediately on orbit. The usual response to a voluntary head turn is shown below.



21 May 1984 Launch Entry Data Review S-7 Tg.

On Pad

Hd. Turns, Time in Secs., Amph in degrees

Cal- 1 div = 1.8° Hd

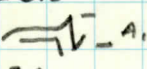
1 div = 1.3° Eye

	Head			Eyes			
	T ₁	T ₂	A, div°	T ₁	T ₂	A ₁	A ₂
E open							
Rt	.3	.8	12	.25	.8	18	-6.
Ctr.	0	.65	12	* cont'd thru zero to Lft. 0.1	.7*	20	0
Lt	0	.7	9.5	.15	.6	-26	-9.
Ctr.							

2 bts nyst

E open								
Rt	0.1	.8	8.	.2	1.4	21	0	1 nys. on 2 stroke
Ctr.	.15	.7	- 6.5	.15	0.9	- 14	- 4.	1 " " return
Lt.	.2	.7	- 10.	.2	.75	- 19	- 4.	2 " " "
Ctr.	.15	.75	+ 10	.15	.75	+ 10	- 2.	3 " " "

E open								
Rt.	.3	.64	4.5	.2	1.2	20	6	3 bts. nyst.
Ctr.	.04	.48	- 4.5	.3	.8	- 30	- 10	slow return toward ctr
Lt.	.16	.68	- 11	.12 ^{fast}	.84	- 29.5	- 12	

Nb. eyes started a 2° drift to ctr. prior to swinging Lt. 

Ctr.	0	.68	8	.12	.32	- 32.	0	
------	---	-----	---	-----	-----	-------	---	--

raising hd. prod. sl. (~ 5 div.) R shift + ↓ hd. sl. Lt. shift.

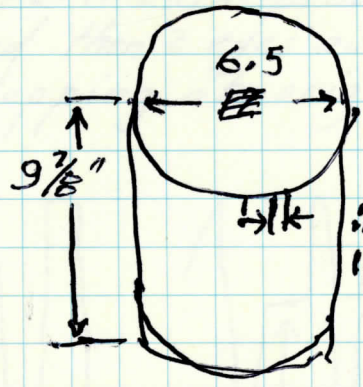
There was a Lt. shift prior to acute swing to Rt.

On Orbit

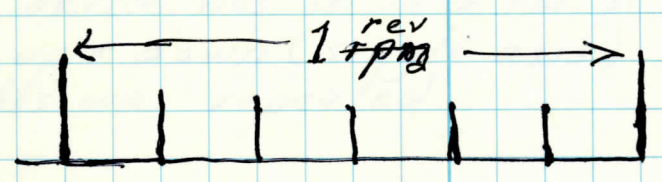
E open								
Rt.	.1	.45	10.	.1	.5*	21	3	1 bts. nys.
Ctr.	0	.55	- 10.	.3*	.35	- 16	- 3	* 1 bts. " , Lt.
Lt.	0	.5	- 12	.15	.4	- 25	- 9	
Same as above E ~ 4 div R shift, then fast left.								
Ctr.	0	.5	- 13 1/2	.3*	.35	- 23	+ 3	* 1 bts. , rt

sl. 1mm undershoot

Optokinetic drum -



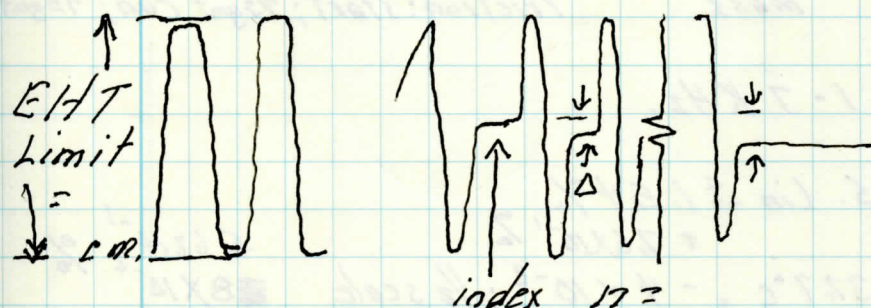
425 wide B1. 12 eq
1.25 " wh 12 eq



Manually inflated deflated

13.9.96 WSU - Reduction of Gern's Kinesthetic data -

Experimental procedure - E.H.T. device was set to a ref. pt and then $\bar{e}$ eyes averted moved up + down (single axis) stopping at original point - this was repeated



A record was found $\bar{e}$ G's pre, in, + $\bar{p}$ flt. trials and reduction will be started -

Pre- 2-22-85

	mm.	Δ mm.	mm	Δ mm
Excursion	+40		+40	
	-46.5	86.5	-46	86

Index +2 - -3.5 -

1	3.5	1.5	0	3.5
2	1.5	-1.5	-2	1.5
3	-2.	-4.	-5	-1.5
4	-7.	-9.	-7	-3.5
5	-10	-12.	-7	-3.5
6	-11.5	-13.5	-5	-1.5
7	-12.0	-14.	-4.5	-1.
8	-12.0	-14.	-8	-4.5
9	-14.	-16.	-4.*	+1.5
10	-14.	-16.	+1.	+4.5
11	-16.5	-18.5	-3.	+1.5
12	-14.	-16.	-2.	1.5
13	-14.5	-16.5	+1.	4.5
14	-17.	-19.	-1.	2.5
15	-18.5	-20.5	-2.	1.5
16	-15.5	-17.5	-5.	-1.5
17	-16.	-18.	-3	+1.5
18	-20.5	-22.5	-1	4.5
19	-23.	-25.	-5	-1.5
20	-26.5	-28.5		

Time 24.5 21.5

2L

* = pause

WSU

13 Sep. '96 E.H.T. device specs.

Size $4 \times 4 \times 16$ ins.; $10.2 \cdot 10.2 \cdot 40.6$ cm-
 Wt. $4/16$; 1.81 kg.

} Notes SL 3 Storage
 reqmts.

Printer size

mass

Friction: start; 45 gmF run; $45 \text{ gmF m}^{-1} \text{ s}$

④ Volt to freq. $0-5$ V. - $1-7$ KHz.

Linearity - 3.6% F.S. Lin $\leq 1.54\%$
 $+ 7.6 \times 10^{-1} \%$

Temp. F.S. $23.2^\circ\text{C} \rightarrow 37.7^\circ\text{C}$, -4×10^{-2} ; $1/2$ scale

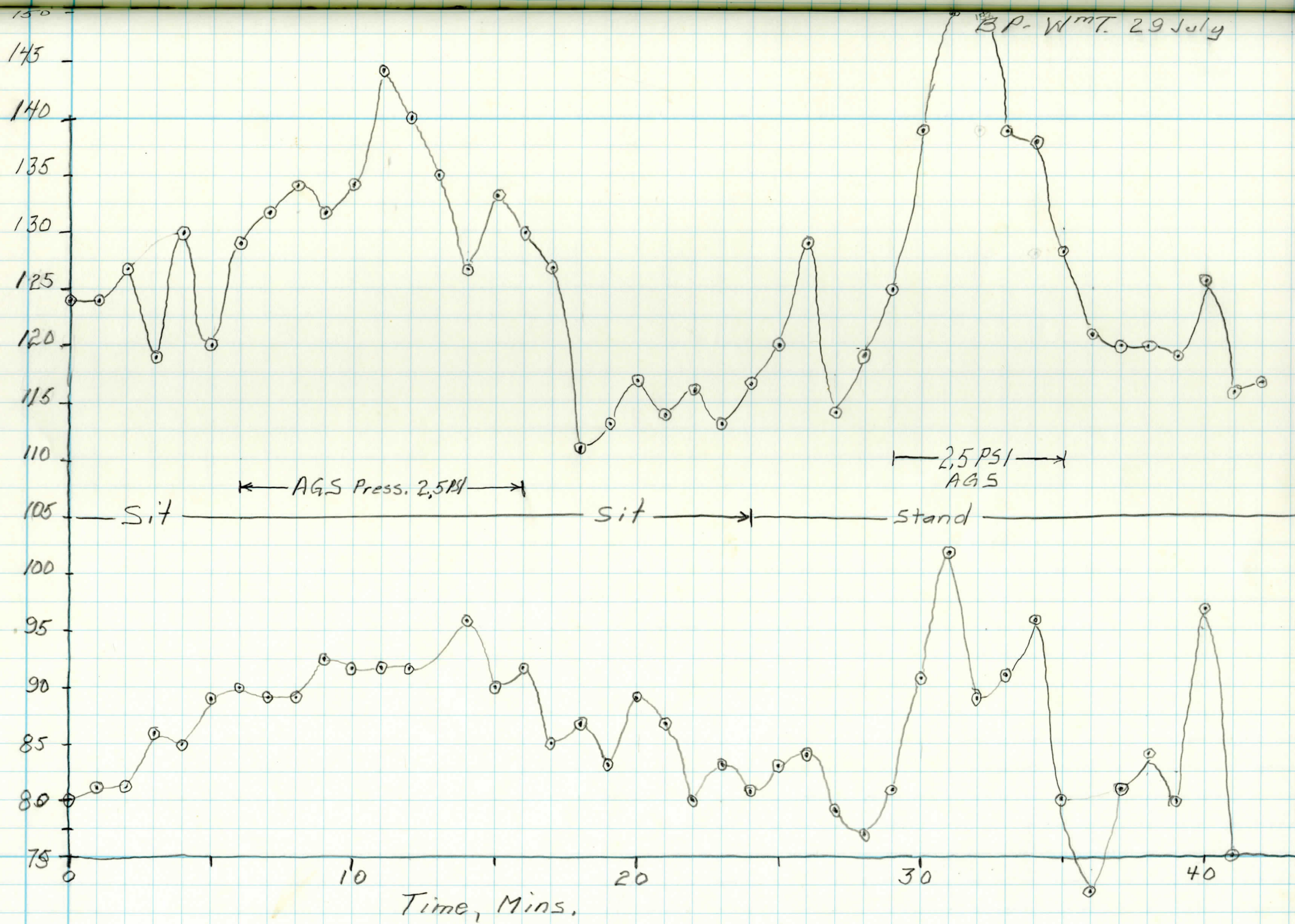
$5.6 \times 10^{-1} \%$
 $8 \times 10^{-2} \%$

Tape Recorder - Δx

; wow + flutter

Graphic Recorder -

④ Accept. test data -



BP see next Pg

Time

BP

Cond
Sit & Press

43:00

119/118

44:00

108/82

45:00

126/90

46:00

118/77

↑ Press - 122 mm Hg

47:00

115/86

BP. WMT. 29 July

29 July

BP - Rcdng. p Sim. e AGS

	Time -	BP
1314	0:00	124/80
	1:00	124/81
DMA P111	2:00	127/81
SN-398	3:00	119/86
	4:00	130/85
	5:00	120/89
	6:00	129/90
	7:00	132/89
	8:00	134/89
Press Reg →	9:00	132/95
	10:00	134/92
	11:00	144/92
	12:00	140/92
	13:00	135/—
	14:00	127/96
	15:00	133/90
	16:00	130/92
	17:00	127/85
	18:00	111 → 112/87
	19:00	113/83
	20:00	117/89
	21:00	114/84
	22:00	116/80
	23:00	113/83
	24:00	117/81
	25:00	120/83
	26:00	129/84
	27:00	114/79
	28:00	122/77
	29:00	125/81
	30:00	139/91
	31:00	150/102
	32:00	153/89
	33:00	139/91
	34:30	138/96
	35:30	128/80
	36:30	121/72
	37:30	120/81
	38:00	120/84
	39:00	119/80
	40:00	126/97
	41:00	116/73

Status

Sit - φ press.

2.5 PSI on G.S.

↓ 87

Dump

Stand
stand

2.5 PSI

↓ Press to 0

Go to Preceding Pg -

29 July 5-8 Reentry Sim -

Repl. D III Batt + Reset 0743 C 1st Read 128/92
NB 1st Coff Failed -

N.B. - Reentry goes fast - simulated
inflation - deflation G suit

Bad 'A' electrodes

CK, C/A -

Pursuit Tgt. doesn't record -

Current reentry plans:

Pre-Start Urine Collection

? blood

Ht.

EOG

stocking

During-

? Eye/Hand

B.P.

AGS -

EOG

Post- In Bird

EOG's

BP

? Eye Hand

Px - past point

Romberg

" c hd. turns

Walk in place

Eyes - pupils, motion

447(?)

On Ground

BP

Blood

Urine

Radio - Thold.

? AEP

Px

EOG

S-8

Record Sheets

A E P

Subj-1 2 3 4 5

Time ____:____:____ M

SONY 1 or 2 Xducer 1 or 2 Clicker 1 or 2 Amp 1 or 2

[X30]

Tape - _____ Temp. ____°F

Footage - (R) I _____ S _____ F Cal. 1 _____ S _____ F

Level _____ II _____ S _____ F 2 _____ S _____ F

Level (L) III _____ S _____ F

Level IV _____ S _____ F

VER

[X10]

Subj. 1 2 3 4 5 Time ____:____:____ M

SONY 1 or 2, Amp _____ R _____ L _____ B _____

Tape Footage I _____

II _____

III _____

EDG

Subj. 1 2 3 4 5 Time ____:____:____ M

AC DC gain .5, 1, 1.5, 2, 2.5 Amp 1 or 2 Tape _____, _____ S _____ F

Cal., Gaze ED, EC, Head Turns ED, EC

Head Osc. E.O., E.C., E.S.

Cal., Hd. Tgt.

Pursuit tracking

Goggles

Time ____:____:____ M

[X30]

Kinesimetry Subj. 1 2 3 4 5 Time ____:____:____ M

Tape _____ unloaded + loaded

Static - V. Forearm, shoulder _____ ft.

Dynamic - Vert. Forearm, shoulder _____

Static - Horiz. Arm, Shoulder _____

Dynamic - Horiz. Arm _____

X20

Height

Subj. 1 2 3 4 5 Time ____:____:____ MET

25
Lines
↓

Record
Sheets

Audiometry, Thold.

Subj. 1 2 3 4 5 Time

R

L

Noise

125

250

500

1 K

2 K

4 K

8 K

X 30

.125 .250 .500 1K or 2K 4K 8K

R

L

Noise

X 12

start

Urine

END

Voids

samples

— : — : M — : — : M — : — : M — ml

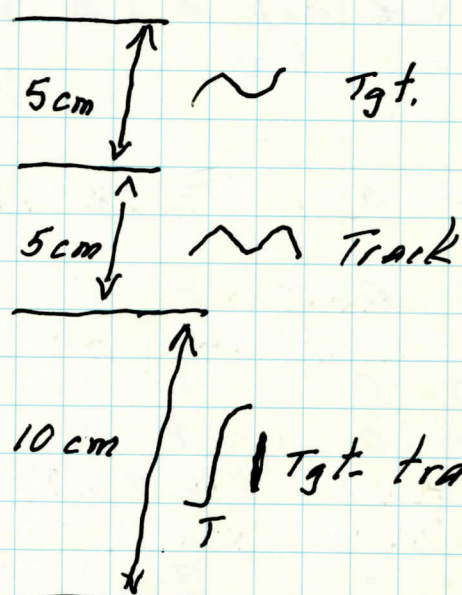
3 Lines

PX

Subj- 1 2 3 4 5 Time

Preflt. Data		Review-					31 July						
	1	2	3	4	5		1	2	3	4	5		
EOG -			HAVE						NEED				
EOG - std.	2	2	2	2	2 (19+ sim)		2	2	2	2	2		
Mon.-		2?											
AEP -	0	0	0	0	0		2	2	2	2	2		
VEP -	0	0	0	0	0		2	2	2	2	2		
Thold. Dist.	0	0	0	0	0		1	1	1	1	1		
Audio STS noise	0	0	0	0	0		1	1	1	1	1		
C Noise		?						2	2	2	2		
Tonometer -	-	-	1	-	-		3	3	3	3	3		
Kinesimeter-	-	-	1	-	-		2	2	2	2	2		
Hts.	1	1	-	1	1		3	3	3	3	3		
Stockings	-	-	-	-	3		8	8	8	8	15		
Blood	X	X	X	X	1		X	X	X	X	1		
Urine	X	X	X	X	1		X	X	X	X	1		
Tonom. Eye	X	X	X	X	2		X	X	X	X	5		
Contractions	X	X	X	X	1		X	X	X	X	1		
Hand eye	-	-	-	-	-		2	2	2	2	2		
VOR	X	X	X	X	3		X	X	X	X	4		
Pill	-	-	-	-	-		1	1	1	1	2		
Pallor	-	-	-	1	2		1	1	1	1	3		
Photo	-	-	1	1	1		1	1	1	1	2		
	-	-	-	1	-		2	2	2	2	2		

9 Sept. 96 W5U - Catalog of Data - EHT - Gorn 51-D
 Krug did a series of graphic replays on 3 channel pen writer -



Integrated abs. value of error was worthless because of drift.

EHT Data might be of interest.

Thagard S-7 6.17.83 (169:
 Thornton S-8 30 Aug '83
 Gorn 51 D 12-19 Apr. '85
 Thornton 51 B 29 Apr. - 6 May '85
 Hilmers 51 J Oct 3 '85 Oct 7
 Conker 61 C Jan 12 '86 Jan 18

S-5 11 Nov '82 315:12:19 L/O 320:

S-6 4 Apr '83

51-C 24 Jan '85

10 Sep. Catalog of EHT/Kinesim-Graphic Records
 EHT-DSO-418 Kines DSO 406
 * = Integ. Tape

51-D- April 12-19, 1985 Garn

MT = mag.
 tape

Pre 6 Feb '85 (32) Integ.
 6 Feb '85 (55) Sim. 00:02:36 00:03:35 + DSO 406
 6 Feb '85 (81) Sim - + DSO 406
 26 Feb '85 ~~7~~ MT-51DT (56) DSO 406

3 Apr. '85 MT-#20 Integ. (24)
 3 Apr. '85 Sub MT-#20 (7) + DSO 406
 3 Apr. '85 MT-#20 (52) + DSO 406
 5 Apr. '85 MT-#25 (27) Integ.
 5 Apr. MT-#25 (46) + DSO 406
 5 Apr. MT-#25 (44) + DSO 406
 ? Sub MT-9 (15) Integ.
 ? Sub MT-9 (31) + DSO 406

In + ? MT-13 (20) Noisy Test Tape

02:02:39/65 MT-9A (54) + DSO 406
 02:02:39 MT-9A (59) ? ident to (54)
 02:02:39 MT-9A (33) Integ.
 02:02:39 MT-9A (19) Integ. ? ident to (33)
 04:03:51 MT-10 (45) + DSO 406
 05:19:10 MT-11 (53) + DSO 406
 05:19:40 MT-11 (49) + DSO 406

Post MT-1 (48) + DSO 406
 MT-2 (51)

22 Apr. '85 MT-6 (76) + DSO 406
 22 Apr. '85 MT-6 (21) Integ -
 22 Apr '85 (6) Integ -

WSU

10 Sep. Catalog of EHT/Kinesion. records Contd.
 Flt. 51J Hilmers 3-7 Oct. 85 ⊕ = Brush
 Pre - 12 Sept. 85 ①
 12 Sept. 85 ④③
 12 Sept. 85 ⑦①
 Pen Record -

19 Sept. 85 MT 51J-1A ⑦⑧ + DSO 406
 19 Sept. 85 MT 51J 1A ④② Integ Error.

In - 01:00:00 MT 51J 1A ⑦⑨ + DSO 406 - NB. Also has Pailes
 01:00:00 MT 51J 1A ③⑧ Integ Error.

2:23:13 MT 51J 1B ⑧ + DSO 406
 2:23:13 MT 51J 1B ⑥①

Pailes NB only in ⑦⑨ & Hilmers

Flt. 61C Conker

Pre - 30 Oct. 85 ①⑦ 12.8 Jan '86 + DSO 406
 30 Oct. 85 ④① + DSO 406
 00:10:23 MT 2A ①③ + DSO 406
 01:03:21 MT-3 + DSO 406

Pre - Flt 51B Thornton 29 Apr - 6 May 1985
 10/11/84 ⑧①

In - M.D. 7 Tape 4 ⑥① + DSO 406
 MD-7 ⑤⑦ ⊕ Integ Error
 MD-547 ⑤⑧ ⊕ + DSO 406
 MD-5 ③⑦ ⊕ Integ. Error.

Post - Post ⑦②

WSU

10 Sept. Catalog of EHT/Kinesim. records Contd.
FLT STS-8 30 Aug. - 5 Sep. 1983

Note - Multiple Subjs. on Record -

Pre. 20 Aug. MS-3. (68)

In- MD-2 - All Crew-(5) (65)

MD-5 - All Crew (5) (70)

Post- 21 Sep. - Plt. Only (63)

24 May 84 MS-3 (50)

WSU

10 Sept. Cat. of EHT/Kines Mag Tapes

Flight 51 D Garr

Case #1

X = msg-

	Cassette	Housing	
26 Feb '85	7	7	
MET- 11:40	9	9	X
MET- 0:02:36	11	11	X
0:03:35	11	11	X
MET- 01:05:42	12	12	X
MET 01:00:34	13	13	X
2030 CST Post	14	14	X
2 Apr '85	19	19	X
23 Apr '85	20	20	X

		Case #2
5 Apr '85	25	25 stat X
MET 02:02:39	51 D 9	51-D-9
	51 D 10	X
MET 05:19:10	51 D 11	
:25:	↓	
:19:40		

? 8:43 AM

2 Case 5
Case 6
16

11 Feb '85

Flight 51 J Hilmers

12 Aug '85

Case 5
4 XMET 01:00:00
02:01:35
02:23:1351 J-1 (A)
(A)
(B)Case 3
15

17 Sept. '85

60 B 16 16

12 Sept. '85

60 C 4 24

Pailes

MET 01:00:00, 02:23:00 ~~60 B 1~~ 15
17 Sep. '85 60 B 16 16

10 Sept. Cat. of EHT Tapes Cont'd.
Flt. 61C Cenker

Case 5

30 Oct '85 60C-3 3

MET 00:10:23 13

MET 01:02:21 14

Flt. 51B Thornton, MS-3

MD-7

60B-4 4 Case 3

Flt 61C Nelson 12 Jan '86

12/10/85 60C-11 Case 5

10 Sep. Raw & Processed Data. D50-441, B.P.

Raw Data-

5-7 Thagard 1201

In 1201 P. 744 P

5-8 Thornton

Pre 11 June 1983 435-1008 P

? 1031-1038 Preflt Col. #351 & 352

? 1001-524 P Preflt. EPROM CK-
6-7 Aug 1983
13 Aug 1983 933A-343 P

Long Sim MD2-3 832A-219 P

Post_ 5.10.84 939A-925 P.

Hardware Testing.

20 Aug. Verification of EPROM erasure
Verification of Flt. Chip I erasure

↓ ↓ ↓ ↓ ↓
II
III
IV
Chip IV Data Load
Verification of ROM Transfer

10 Sept. ^{Raw} ~~Processed~~ Data D50 441
 Pre Flt 41D Walker (PS)

Aug 30 - Sept. 5, 1984

5-14-84 - 939 A - 925 A.

Pre Flt 41G Scully Powers
 9.30.84 201P - 327P

Plot of data

11 Sept.

Raw Data. Bed Rest $\bar{c}$ Musculo Skel. Counter M.
 Holter Monitor $\bar{c}$ accelerometer ($\ddot{z}$) magnetic tapes

Subject A-

Box A-1	14	tapes	9.25 $\rightarrow$ 10.7
Box A-2	14	tapes	10.8 $\rightarrow$ 10.22
	4	tapes	10.22 $\rightarrow$ 10.26

Subject B.

Box B-1	13	tapes	9/20 $\rightarrow$ 10/8
$\downarrow$ B-2	$\downarrow$	$\downarrow$	10/9 $\rightarrow$ 10/23
$\downarrow$ B-3	$\downarrow$	$\downarrow$	10/24 $\rightarrow$ 12/6

Subject C

Box C-1	$\approx$ 4	tapes	9/28 $\rightarrow$ 10/1
---------	-------------	-------	-------------------------

Subject C-2

Box C-1	8	tapes	10/6 $\rightarrow$ 10/13
	1	"	10/13 defect.
Box C-2	13	tapes	10/14 $\rightarrow$ 10/27
Box C-3	11	$\downarrow$	11/2 $\rightarrow$ 12/9

M. 11 Sept. Raw Data - Graphic Records EOG (EOM)

DSO-403

Launch/Entry

Launch

Entry-Landing

S-5

- Allen - Mixed EOG X, Z (1A1)
- ↓ (1A2)
- ↓ (1A3)
- ↓ (D)

- Lenoir • 318:10:54
- ↓ 320:14:27-35 Pat. Cals, Hd. Trns.
- ↓ 13:38 Wheels Stop
- ↓ 13:56

S-6

- Musgrave, Holter EOG, B
- No Calib.

- Peterson; Incomplete, short

S-7

- Thagard, Launch to 1° LOS
- ↓ ↓ ↓ DAK
- ↓ 169:09:41 (A)*

- Thagard, 175:13: * (Ldg.:13:57) (B)
- ↓ 175:13:43-:14:01 (B)

MS-1 447 recorder

MS-1 447 recorder

S-8

- Thornton, 1g trainer in vertical
- ↓ Pre Launch, 242:04:20 (A)
- ↓ (B)
- ↓ (C)
- ↓ (D)
- ↓ 242:06:19-48 (A)*
- ↓ :10- (B)
- ↓ 242:06:20-44 (A)*
- ↓ 242:06:10 (B)*
- ↓ , 0222- (C)*
- ↓ 242:06:42-9 (A)
- ↓ 0225-0244 (C)*
- ↓ , 14 July 83, 217:00:10 TCOT (A)
- ↓ , Launch 242:06:20:42 (A)
- ↓ , Pre Launch, A. 01-107 (D)
- ↓ , 217:01:43 TCOT (A)

- W.T. 248:02:52-03:00 (A)
- ↓ :05:43
- ↓ 07:01-:07
- ↓ 07:07-:41
- ↓ 08:07:27-08:14

Addenda

S-5

- Allen 24 Sept. TCOT (D)

S-6

- All Crew 96:05:23-56 No Head data (A)
- DSO 404

(D) = thermal record * = Lift off or Touch down W.T. = Thornton
 (A) = 8 channel KSC/JSC record (B) = 2 Channel JSC record (C) = 2 Ch., local time

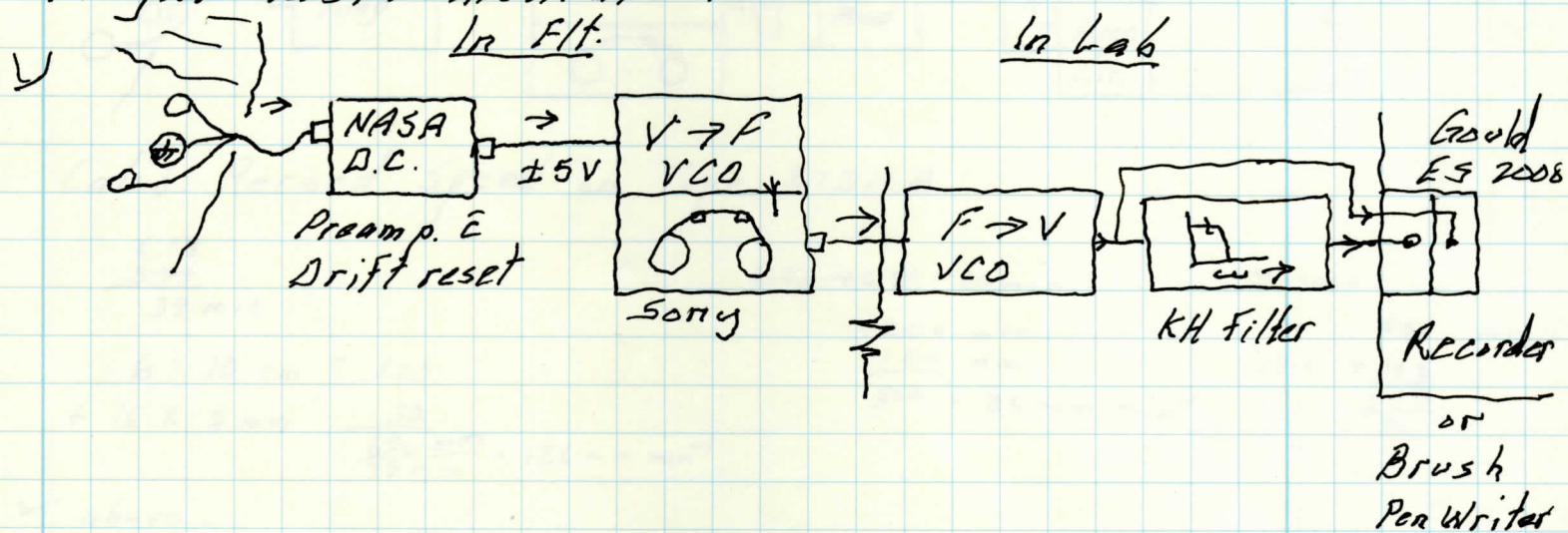
W/ S U

14 Sept. 96 EGG Raw Graphic Data

Methodology - Tested & modified Holter Recorder - Time correct.

↑↑ - DMA 1984

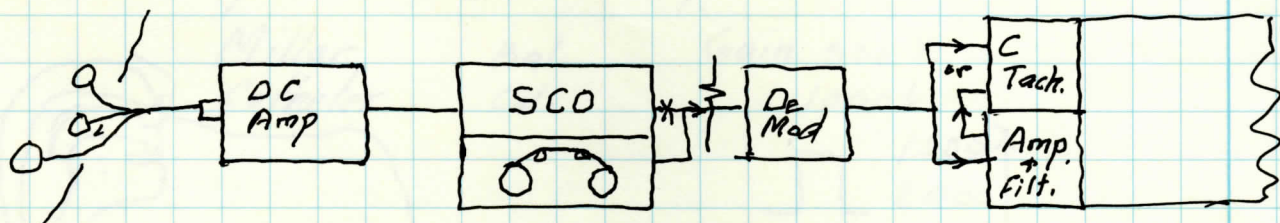
Flight Instrumentation -

In Flt.In Lab

STS-51D Flt. Records Gorn -
 Pre-

WSU

16 Sept. H.R. Variability -



Calib. Record Speed on Tape 51D16B

$$\begin{array}{r} 6:23 \\ 5:44 \\ \hline 39 \text{ min} \end{array}$$

$$\begin{array}{l} 6 \times 10 \text{ cm} = 600 \\ + 16 \times 5 \text{ mm} = 80 \\ \hline \frac{680 \text{ mm}}{39 \text{ min}} = 17.6 \text{ mm min}^{-1} \end{array}$$

$$6:03 \rightarrow 6:23 = 20 \text{ min}$$

$$\begin{array}{r} 200 \text{ mm} \\ 100 \text{ mm} \\ \hline 300 = 25 \text{ mm min}^{-1} \end{array}$$

$$36 \text{ min}$$

$$\begin{array}{r} 400 \text{ mm} \\ 29.5 + 14.5 \\ \hline \frac{545}{36} = \end{array}$$

✓ above -

counting 5 mm segs -

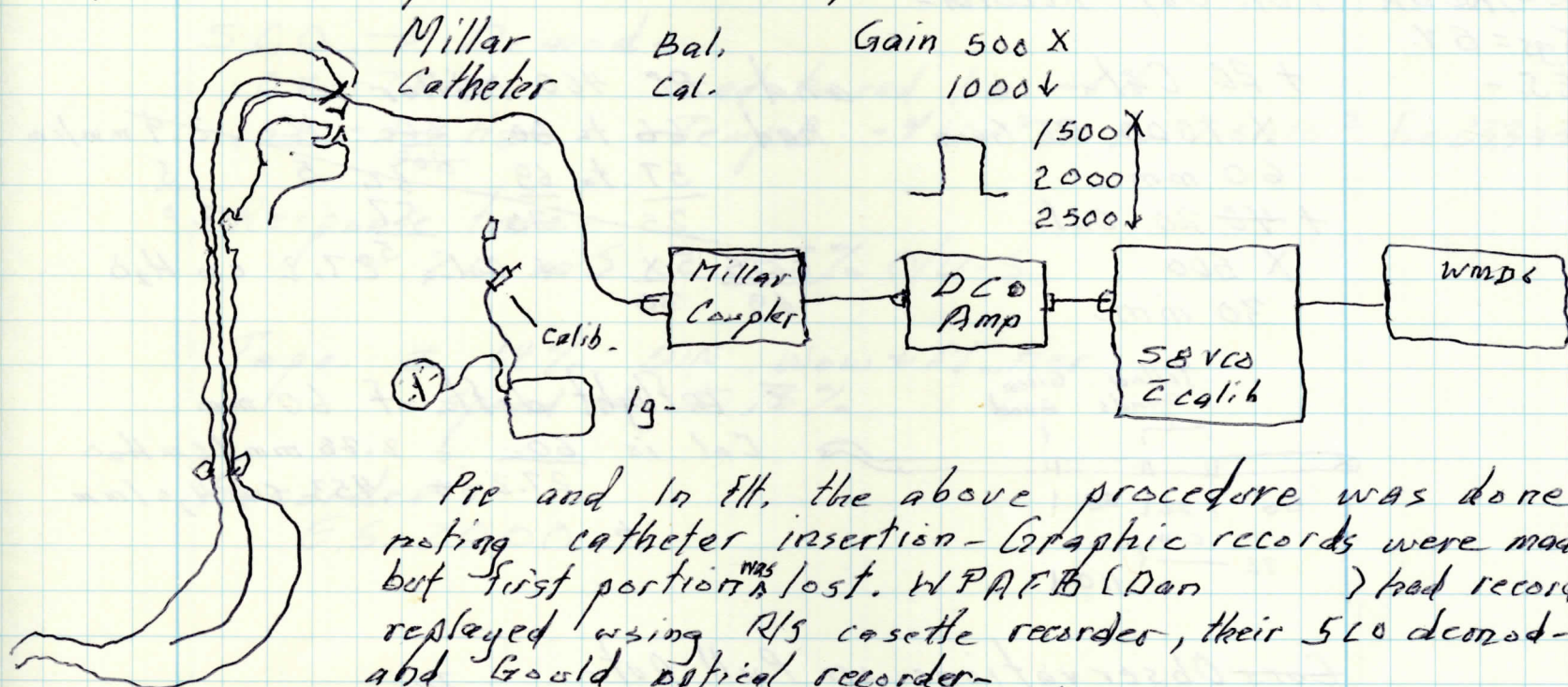
mins	segs	
7	28	3
3	9	3
9	28	3.1
4	15	3.7
12	35	2.9
35	107	3.05
		$\frac{5}{15 \text{ mm/min}}$

mins	segs	
2	5	2.5
11	32	1.9
2	5	2.5
8	22	2.75
8	26	3.25
37	90	2.43
		$\frac{5}{120}$

$$\begin{array}{r} 36 \quad 4.25 = 80 \\ 29.5 + 14.5 \\ \hline 94.5 \end{array}$$

W S U

16 Sept. Intra esophageal-gastric pressure.



Pre and In flt. the above procedure was done making catheter insertion - Graphic records were made but first portion ^{was} lost. WPAFB (Dan) had record replayed using R/S cassette recorder, their 500 decond- and Gould optical recorder.

Record was replayed from orig. tape at 1 cm sec⁻¹ - Ch 2 ampl- 50 mm + 20 V F.S. (recorder cal) or 2.5 V/5 mm - Start.

Rchr - 0 = 15 mm - 4 Step, 500 cal - ~ 2 V step⁻¹

Transducer zero is -13 mm (ref. upper graphic limit)

± 9 ~ 24 mm neg step (? D.C. Amp. or coupler?)

NB. This record was inverted -

I have exit or pull out record at correct polarity and higher gain
Recorder gain of my record is.

Known step levels -

down step levels -		orig. record	
mm	$\times .4 \text{ V/mm}^{-1} =$	mm	$\div \text{mm}$
5	↓	2.0 → 2.00	30 = .0666 V/mm^{-1}
11		4.4 4.00	60 = .0666
16		6.4 - 6.00	85 (saturated)

Rick - Photo/dwg. of
3 - Blocks

From 20 Aug Calib. record -

5 cm H₂O ± .5V = 20 cm.

60 mm + Amp Gain 500?

60
63 ↓

Miller PC 350
S/N 4155

5 V F.S. (200 mm)

1000

Defl.

12.5

26.

40.

53.

66.

80

cm H₂O

15.0

100

15.

20.

25

30

+ 20 = 72

Cal

Miller PC 460
S/N 460

Defl.

11

22

34

45.5

57.

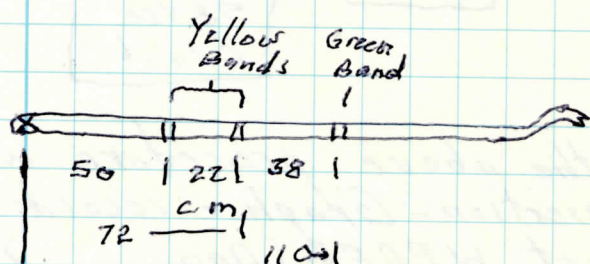
69. + 20 = 62.5

Cal

17 Sept. In F/lt. 5-8
SCC/RCDR Pull Out Record-
Sys = 5 V.
F.S. -

+ 20 Cal.
X 1000 D.C. Gain
60 mm.
+ 40 20 Cal.
X 500
30 mm.

and PC 460 Miller
had 66 to 80 $\frac{66}{57}$ to $\frac{80}{69}$ $\frac{12}{5}$ = 2.4 mm/cm
 $\frac{25}{30}$ $\frac{57}{12.0}$
 $\frac{62.5}{69} \times \frac{X}{30}$ & Cal = 527.2 cm H₂O



$\bar{c}$ in flight defl. of 60 mm.

Cal is $\frac{60}{27.2} = 2.28 \text{ mm/cm H}_2\text{O}$
to .453 cm H₂O/mm

Corr Observations on Pull Out-

5-8 $\bar{c}$ to $\bar{c}$ cm H₂O

In Stomach 25 mm. 13 5.9

17

mean Press.

Resp. Excursion

1g	Zero Corr.	cm H ₂ O
50	45	18.7
55	50	20.8
15	10	20.8 4.16
10		
17		
7		

In Stomach

~~Zero~~

mean press! 32 27 11.73

Lower Es.

? present

Cardiogenic osc 25

5 -7 -3.2

mean press! 30 → 25 10.4
Cardiogenic 15

Upper Es.

12

5

Zero

453

.416 cm H₂O/mm.

Cal Factor

18 Sep. 96 Data Recording System

SCO $\rightarrow$ Demod -

0V - 7 KHz

end to end lin. $\sim 1\%$

5V - 1 KHz

Temp D. $\sim 4 \times 10^{-2}\%$ to 7.6×10^{-2} for 23.3 $\rightarrow$ 23.7 $^{\circ}\text{C}$

Response time -

 $\sim 20 \text{ ms}$ $\approx \sim 3\%$ O/U-STape $\pm .14\%$ DIN Wow + Flutter
speed $\Delta \pm .3\%$

Recorders

E.S. 2000 -

18 Sep. EHT status

Pre- In-

WT — 4 subs -
Graphic Records

Center ~~2~~ subj. W.T. (51B)

Gar ~~Garr~~ Center

Garr

Hilomers

2*

2*

2*

2*

2*

2* (10)*

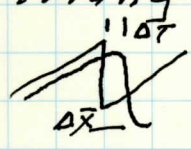
2* (10)

2*

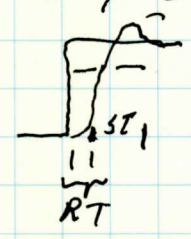
* = analyzed

{ } avail Analyzed for:

Sine: D-U/s, Phase, Triang-
absolute, secs,



Step 0.4s



18 Sep

Mag. Tape Archive -

Cassette/data tapes - ~~Are~~ ^{at} Originals have a variety of I.D.s which may overlap. These are identified unambiguously where possible. Most tapes have labels & some additional data such as times, etc.

They are stored in a variety of cases (Case # = Box #.)

Identification Scheme is -

DATA: Tape ; Box

Flights
Subjects

Tape description

Sept 19 Classification of WSW DSO data

Data Class-

(underlines indicate key information)

- Raw (graphic) D

Tape T

Summary (Processed) SD

Document (Publication) Do

Basic DSO

I.D. Flight Phase (Pre In Post)

Subject Time

Item No. (Accession No.) } assigned by
Box No. } Fordham

DSO Sub classes (T - Test of Equip. Subjs. etc)

404 - Eye/Head Tracking on Orbit

OPK - Optokinetic

Gyr - Gyroscopic Instrumentation

455 - Clin. Charact. of SMS

BS - Bowel Sounds (GI motility)

EEG - ~~EE~~ Electroencephalography

EKG - ElectroGastrography

Sb - Sternberg Complex Reaction Time

T - Test

19 Sept. Classification, Cont'd.
Non DSO Categories

Exercise Countermeasures ECM

Treadmill T.M.

Anthropometry ANTHRO

78 (Anthropometrics of 220 astronaut candidates)

SWR (Kinesimeter, Goniometer)

SL (Sky Lab)

DSO Development and Test DSO D/T

WSU

20 Sept D. D

Described gastric mat'l in taking

Graphic - All

Cataloged -

441

418

404

455

BS

RR

EGG

EFG

56.

403

406 in work

423

Typed

? 404

418

copies

Redundant mat'l. ?? tapes, reports.

10 boxes of cassette tapes

25 Sept, '96

Mtg. E Hoyer, Mosely and Li

Briefed them on W5U effort and gave them memos
and catalog draft.

Plan is to get DSO 403-4 done and on line.

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8.8

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