SHUTTLE FLIGHT EXPERIMENT
30-DAY SUMMARY REPORT

National Aeronautics and Space Administration

Ames Research Center
Moffett Field, California 94035

ARC 275a (Feb 81)

Enclosure IV:

Part B. Shuttle Flight Experiment

Progress Report Sent to MSFC: 30 Day Summary Report of SL-3 Experiment #3AFT23: "A Preventive Method for the Space Adaptation Syndrome"

National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, California 94035

NASA

Reply to Attn of SLN:239A-2

TO: NASA/Marshall Space Flight Center
ED42/George Fichtl, Mission Scientist, Space Lab 3

FROM: Patricia S. Cowings, Research Psychologist,
Biomedical Research Division

SUBJECT: 30 Day Summary Report on SL 3 Experiment #3AFT23:
"A Preventive Method for the Space Adaptation Syndrome"

1. Preflight Training Schedules:

A total of 12 AFT training sessions were administered to SL 3 Payload Specialists (2 Primes and Back Ups) over a 7 month period, from September 1984 through March, 1985. Nine of these sessions were 2 hours in duration and three were 3 hours in duration. A total of three rotating chair tests (training tests) were conducted in this time frame with four subjects.

Figure 1, attached, shows the performance of these crewmen across tests. Test 1, a baseline motion sickness test, was conducted approximately 10 months prior to the mission, before any AFT was administered. Test 2 was administered after 2 hours of AFT, test 3 after 4 hours and test 4 after 6 hours (total) of training in symptom control. Improvement in performance is reflected by a subject's ability to tolerate a greater number of rotations across tests. As can be seen, Subject #32 showed the greatest improvement while subject #33 showed the least improvement. Additional training for crewman was not possible within the constraints of the mission. Results of the mission indicate that, as predicted preflight (ref. minutes of Flight Rediness Review by H. Finger, dated April 25, 1985), subject #32 was (relatively) symptom free inflight while subject #33 was not.

Figure 2, attached, shows group averages (N=6) of performance across tests using three different schedules of AFT. Schedules 1 and 2 were obtained from ground based studies performed on paid test subjects at Ames Research Center, while Schedule 3 was that used for 51 C (2 crewmembers) and 51 B (four crewmembers). In Schedule 1, AFT sessions were conducted on consecutive days (motion sickness tests at 5 day intervals). Schedule 2 reflects more compressed training (i.e., 2 to 3 sessions per day) with motion sickness tests administered on alternate days. Schedule 3, as mentioned above, was administered over a 7 month period with training tests administered as many as 120 days apart in some instances.

Because Schedule 3 was less effective in producing significant improvement in test subjects than previously used schedules, the investigators recommend utilizing Schedule 1, administered approximately 10 months prior to the

mission for future flight tests of AFT. The period of L-3 to L 1 months will further be used for "refresher" training (AFT) of crewmen. In the latter time-frame, we recommend the use of KC-135 flights instead of rotating chair tests as a means of assessing crew performance and for transferring learned control of symptoms from the laboratory to an ambulatory environment.

2. Preflight Training Classes: Ingress, Post Insertion/De-orbit Prep. Ops.

The crew was given the opportunity to practice and evaluate procedures. The most experienced crewman provided recommendations for changes in the flight data file book, checklists, and time requirements for performing procedures inflight. All of these recommendations were adopted. Additionally, each crewman was provided with his/her flight garments for purposes of evaluating the "fit". Recommended changes in garments were made (between the first and second class). Procedures such as "un zipping" the top of garment to further improve comfort inflight (if a crewman decided this was necessary) were evaluated and discussed in the prescence of the deputy mission manager.

3. Joint Integrated Simulations:

These simulations were a valuable exercise for the PI POCC teams. Additionally, 51 B cremwmbers (during the last two simulations) were given actual flight hardware (i.e., garments, headsets with accelerometers, and AFS units) to utilize. Any recommended changes to procedures or hardware (i.e., garments properly sized and use of STS headsets), should have been made at this time.

4. Near Launch Activities: TCDT, L 1 day.

At the Terminal Count-down Demonstration Test (TCDT), approximately 1Ø days before launch, the AFT experiment manager was told by 3 of the 4 crewmembers that they were unsatisfied with the "fit" of their flight garments. Using crew-provided measurements (e.g., of chest), these garments were hand carried back to our contractor, and modifications to the garments were performed. On the day prior to launch, these crewmembers were still unsatisfied with garment fit. In order to prevent elimination of this experiment from the mission, the garments were modified on the spot (i.e., chest straps were cut, sleeves were removed). Unfortunately, these modifications resulted in the loss of the "chest" respiration measurement on affected crewmen. NOTE: respiration data described in paragraph 7, below, was obtained from the abdominal transducer which was not similarly modified.

To prevent recurrence of these events in future missions, garment tailoring will be completed following Training Classes and Simulations and crew approval solicited at that time.

5. POCC Activities:

Because of our experiences during Joint Integrated simulation, PI POCC activities were performed smoothly. A copy of the AFT POCC Console log is attached. Changes in our activities recommended for future missions are:

(a) Determine optimum location and "size" of PI POCC station.
(b) Request TV down link or record our own (i.e., provide a VCR).

(c) Provide sufficient personnel to enable 8 hour shifts on console.

6. Post flight Debrief:

Only those aspects of the post flight debrief which do not address inflight symptomatology are discussed within this report.

(a) Skin irritation reported by one crewman, was caused by the adhesive on the ECG electrodes.
Proposed correction: (1) Use hypo allergenic (infant) electrodes in future; (2) reduce crew recording time to first three mission days.
(b) Inefficient Stowage Design. Proposed correction: (1) Utilize stowage design provided by investigators; (2) All stowage, except for garments and electrodes, to be moved from middeck to module; (3) re package disposable electrodes in sets of 2 or 3 (usage required). Request crew assessment.
(c) Size of AFS (recorder and amplifiers) and feedback display too large. Perform cost/schedule assessment of re packaging hardware and evaluate use of a smaller cassette tape recorder. Request crew assessment.
(d) Accelerometer mounted on STS headset caused discomfort above ear. Relocate accelerometer (i.e., higher up) on STS head band. Request crew assessment.

7. Preliminary Assessment of Quantity/Quality of Flight Data Obtained:

A total of 36 (used) cassette tapes was returned to the investigators following SL 3. Our first review of these data involved:
(a) Re recording digital cassette tapes onto 14 track FM Analog tape.
(b) Displaying analog tapes on strip chart paper.
(c) Reviewing strip-chart records (raw wave forms), in consecutive 12 minute epochs to determine the quantity of data collected on each crewmember in flight, and the percent of data which was artifact free (i.e., that can be analyzed).
(d) Summary pages for each crewman are attached. NOTE: In some instances, the notation "no data recorded" reflects failure of crewmen to perform time-lined cassette change out as instructed in PCAP.

Preliminary assessment indicates that the majority of data obtained can be subjected to further data reduction and analysis. Data on the multi plexed channel, hand temperature and accelerometer, have not yet been played back from cassette. The deterioration of signal quality observed for Blood Volume Pulse (See Encl. #4), can be attributed to one of the following: (1) transducer failure; (2) improper placement of transducer by crewman; or (3) failure to perform malfunction procedures. Conditions 1 and 2 above could have been corrected by performing malfunction procedures or use of spare transducers. Further, use of the feedback display (even by Control Group subjects) would have indicated non functioning transducer. No negative report was received at POCC concerning this failure. As finger temperature is a "back up" for information on peripheral vasomotor activity (normally provided by BVP),

assessment of impact on data lost will have to await play back of temperature data from cassette.

For data analyses two courses of action are be pursued in parallel. Herb Finger (AFT Exp. Manager) is attempting to complete the developing of the SRI playback system. He will be working with the assistance of our Senior Programmer.

Secondly, we are investigating the use of a VAX Computer (belonging to code FL) for purposes of producing 9 track tapes of data from analog records. These 9-track tapes would then be subjected to data/reduction analyses software of the Sun Computer.

Patricia S. Cowings, Ph.D.

Enclosures:
(1) Figure 1: Preflight Performance of 51 B crew
(2) Figure 2: Three Schedules of AFT
(3) SL3 AFT Console Log
(4) Summary Pages (4) on Quantity/Quality of Flight Data
(5) Minutes of Flight Readiness Review dated April 25, 1985

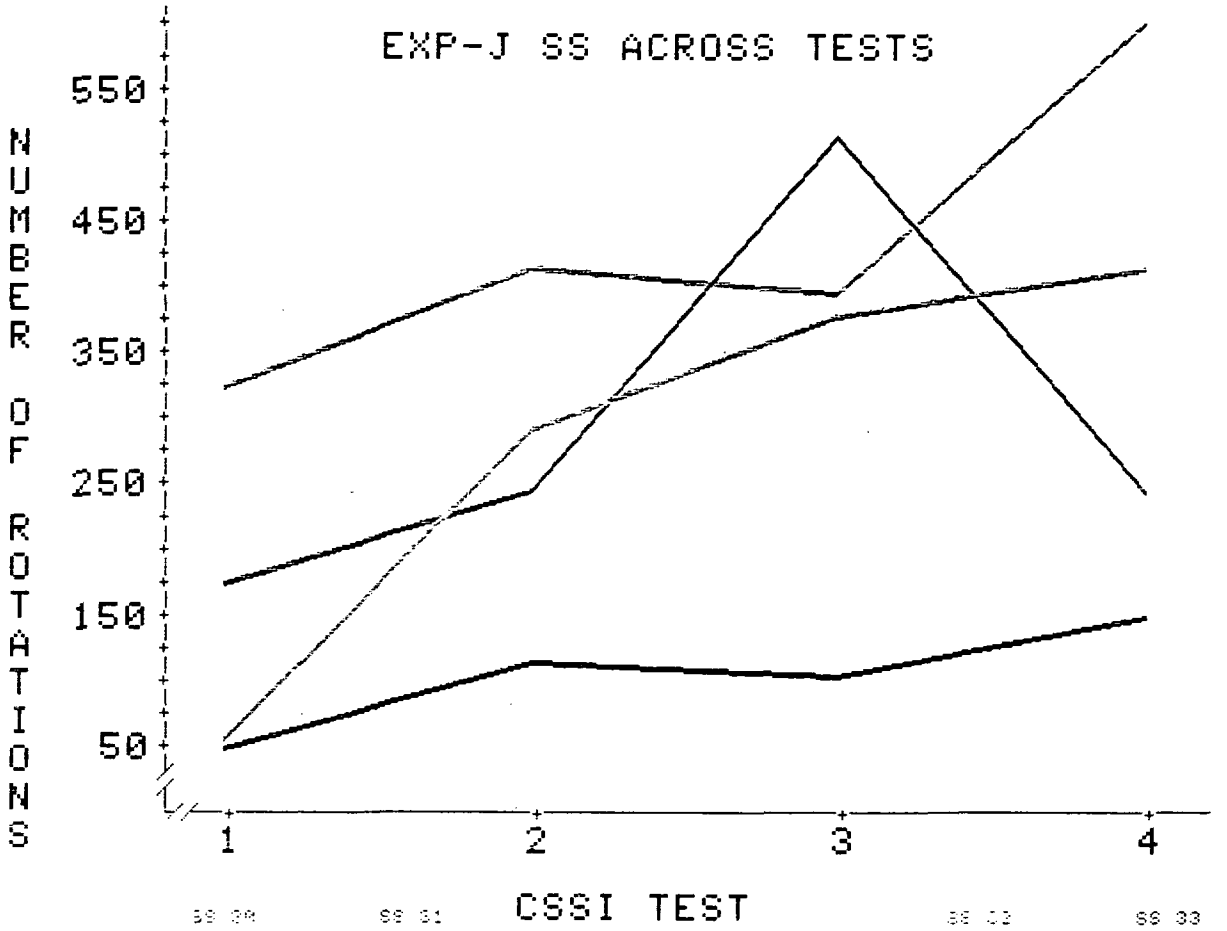
cc:
MSFC/JA21 J. Cremin w/o Enclosures
MSFC/JA51 R. Mcbrayer w/o Enclosures

ABC
JCS
JB
MMC
KAS
WEB
HJF
ALG
SM

PSCowings:kec 6-12-85/5724/6848

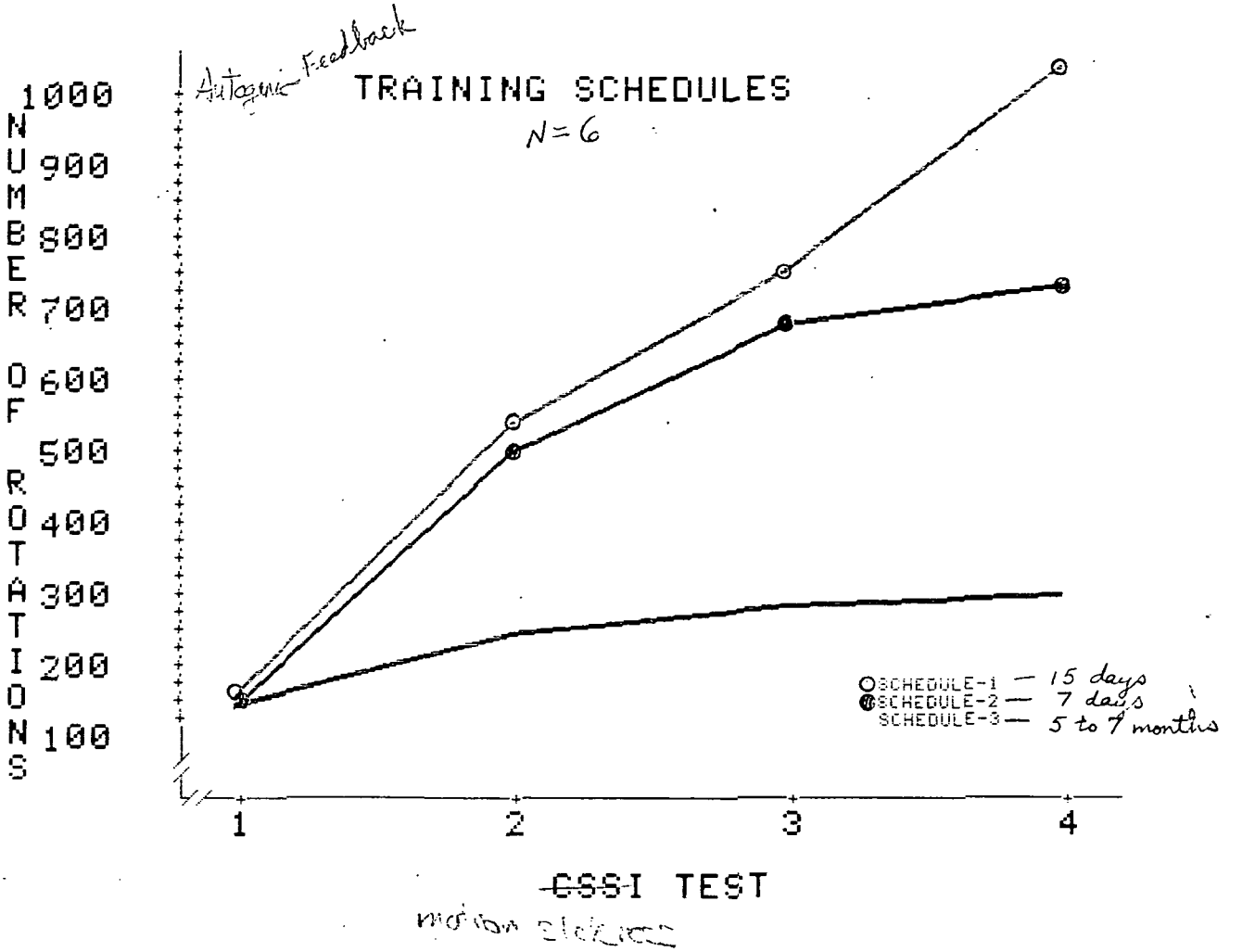
Enclosure 1

Figure 1: Preflight Performance of 51-B crew


EXP-J SS ACROSS TESTS
NUMBER OF ROTATIONS
550
450
350
250
150
50
1
2
3
4
CSSI TEST
SS 00
SS 01
SS 02
SS 03

Enclosure 2

Figure 2: Three Schedules of AFT


Autogenic Feedback
TRAINING SCHEDULES
N=6
NUMBER OF ROTATIONS
1000
900
800
700
600
500
400
300
200
100
1
2
3
4
SCHEDULE-1 — 15 days
SCHEDULE-2 — 7 days
SCHEDULE-3 — 5 to 7 months
~~CSSI~~ TEST
motion sickness

Enclosure 3

SL3 AFT Console Log

AFT
CONSOLE-LOG

MET EVENT

L-2:00
Received telephone message from H. Finger @ KSC all pre flight donning procedures nominal.

0/04:41:00
TV of module showed MS-3 with AFS on body but no on MS-1 (Lind). All moving around a lot.

0/04:47:00
TV showed PS-F (Wang) also wearing AFS.

0/04:50:00
(Approx. Time) PS-M entered module long enough to see that he had his AFS on. Shoulder strap was dangling.

0/05:30:00
PS-F seems to have slowed movement- exited module- Note: neither MS-3 or PS-F has on shoulder strap. At this time MS-1 still doesn't have the AFS on. Looks like MS-3 has on head set/accel but does not look like PS-F has on our head set.

0/06:27:00
A/G from MS-3. AFT change out done ("a bit late"). No time to do the diagnostic scale.

0/06:34:00
AFT-PI asked Ms Sci _OC :(1) Did all crewmen fail to perform diagnostic? (2) Did all crewmen perform cassett change? (3) Is MS-1 wearing the AFS unit?
Question was not called-up to crew because A/G-1 was busy. Mis Sci suggested we submit an OCR with the question - we decided to just wait and monitor A/G for a while to see if the answer is called down as part of regular A/G conversation. No negative report. Assume PS-F preformed all AFT tasks as per PCAP.

0/07:42:58
Called OC to ask do we have to prepare an OCR in oder to voice up an inquiry (by CIC) as to whether or not MS-1 has donned the hardware? OC response: "No, don't have to prepare an OCR" (will take care of it?).

0/08:03:00
Heard OC tell POD about our request for status of MS-1 - Will wait until SAL-OPS completion to ask. He's running behind (missing lunch?)

0/09:16:35
Asked Mis Sci - can we get a "yes" or a "no" from MS-1 on whether or not he has on the AFT equipment? Noted MS-1 is busy - will ask ASAP.

0/09:55:00
TV module showed that MS-1 has not worn the AFT hardware this shift.

0/09:56:00
OCR AFT-001 = Have MS-3 do diagnostic before stowage.
OCR AFT-002 = Have MS-1 turn off power of AFS and stow both tapes prior to pre-sleep.

0/11:35:00
Heard OC to POD recommend that OCR's AFT #001 & #002 be up linked (A/G) as soon as possible (when things quiet down - prior to H/O).

0/11:50:00
MS-1 & MS-3 acknowledged that they will preform diagnostic scale during pre-sleep period.

0/16:18:00
PS-M requests location of "spare electrodes". We informed APS that the location was MF71M stowage, ("ECG only"). This was concurred by CIC. PSM returned to middeck to look for eletrodes in MF71M stowage tray. L. Edsinger had stowage drawings that showed "BSR Electrodes" in MF710 under AFS units. We are not sure which "spare electrodes" PS-M was looking for, but have passed this info. along to APS who will convey message to PS-M. PS-M later reported that he was looking for BSR electrodes.

0/16:40:00
Video down-link showed PS-M wearing all AFS hardware. Using foot restraints in spacelab.

0/20:40:00
Joe Cremin called to find out status of AFT experiment. Reported to him that MS-1 did not wear AFT hardware during previous gold shift.MS-3,PS-F, and PS-M have all worn AFT hardware on thier shifts.

0/23:12:00
Both MS-3 and PS-F reported that they were using AFT hardware. PS-F reported that he is preforming his exercise.

1/00:10:00
MS-3 reported that he had removed AFT headset due to comm problem. AFT reported that a spare is available in stowage.

1/00:10:00
MS-1 reported that he began AFT recording.

1/00:36:00
CIC to MS-3 told him location of the spare. He (MS-3) will get it ASAP.

1/01:14:00
Called OC, asked if MS-3 could change headset prior to his lunch period. OC said call him back at 1/03:30 during LOS to remind him and he'll remind MS-3 (thru CIC). Tell OC that spare headsets are <u>under</u> the transducer set assemblies in locker MF71M.

1/04:00:00
RR submited to get data on lodewig on MD4 silver shift.

1/04:57:00
A/G MS-3 says can't wear gown and AFS suggested encasing AFS in plastic. Can't wear AFS over gown because gown is "trashed" after use and if any contaminents get on AFS unit it would have to be stowed for remainder of the mission. Recommend wearing it on his back - no good - stll exposed. Suggest encase AFS in plastic. Checking with stowage for this much plastic.

1/05:05:00
A/G cassette change and diagnostic done by MS-3. MS-3 is still not wearing the headset with accelerometer. Will get to it when he can.

1/05:06:00
CPE called to get AFS dimensions so they can evaluate whether there's enough plastic aboard. Melinda said yes. (MSFC stowage officer)

1/05:26:00
Talked to CPE told her that ARC thinks should be enough room under gown if AFS is worn in back. CPE told POD. He says "Ok I think I know what's happening."

1/08:00:00
MS-3 reports on A/G that he has now put on the spare headset and it works.

1/11:15:00
PS-M seen on TV wearing AFS. Couldn't see if wrist display and headset were on.

1/15:16:00
PS-M seen with headset. Wrist display may be hidden under sleeve. Shoulder strap not in evidence.

1/18:45:00
Clear view of PS-M. Left arm shows watch but no RCDU being worn.

1/23:17:00
MS-1, MS-3, and PS-F were observed wearing equipment. APS advised PS-F to remove AFS and ring during DDM IFM. APS also advised PS-F to secure cables during that time. Taylor replied that he would not remove AFS until he was ready to start the IFM.

1/23:21:00
Great shot of MS-3 wearing AFS.

2/00:00:00 aprox
Viewed MS-3 and PS-F on video down. PS-F had to remove both the AFS and finger transducer to perform IFM on DDM payload rock. Tape is running so we'll be able, post-flight, to determine how long this took before he replaced hardware.

2/00:58:00
MS-1 called down that he replaced the battery, went thru normal start up, displays ok, did not pull tape. Turned off AFS, repositioned tape, started up, still did not pull tape. Herbie recommended pushing micro-switch.

2/01:40:00
Called OC said Herbie recommended a fix but might take too much time. Recommend MS-1 stow his unit and use spare - make sure correct tape is in, (2A). Note OCR #AFT-003 says - change battery and reactivate. If not pulling tape, stow AFS and use spare.

2/01:50:00
Called Mis Sci. Can this OCR be voiced to MS-1 while he is in middeck? He'll be having lunch when AOS comes back and will be in a good place to fix the AFS.

2/02:32:00
OCR #AFT-003 was voiced up to MS-1. He will call back with status after lunch (2/50:00). Note: more info on original failure: MS-1 said first he'd put in a used battery (not in bag) and it didn't pull tape. Then he put in a new battery (sealed) and still didn't pull tape.

2/02:53:00
Note: CIC told MS-3 he should change AFT tape before lunch and he could go to lunch early. Ask OC what time MET so we know how long tape runs. MS-3 should be writing MET in his diagnostic book so we'll know when he pulled tape.

2/03:00:00
APS told us that PS-F put his AFS unit back on before lunch aprox 2/02:50:00.

2/03:15:00
MS-3 called and said his headset band was not fitting properly (pressure at the temple or above the ears) so he was changing to another STS headset. Question to OC will he use the 2nd spare AFS headset? We may lose these data for the rest of the day. Monitor A/G to see if he puts it back on. If no word, write OCR to try 2nd spare AFS headset. Generate a question about this for post-flight debrief.

2/04:10:00
MS-1 tried battery change again. No tape pull although (1003 AFS) displays ok.

Has taken out spare AFS (1005) and will try it ASAP.

2/04:14:00
A/G voice up to MS-1. Since he's scheduled for a tape change out soon (2/04:55:00), please use tape 2B when he starts up the AFS. Note to us: If spare batteries are needed later in the mission we have no way of identifying the first fresh spare battery that was discarded. However the 2nd fresh battery (if needed) is in the "dead" AFS (1003) now in stowage (not in pouch).

2/04:58:00
MS-3 changed tape (had a malfunction removing tape but ok now). Now has on AFS headset (no pain). Proceeding nom-ops remainder of shift.

2/05:50:00
Called OC and asked for a status up-date on MS-1. Said he'd try and get it for us. Didn't hear this pass.

2/07:18:00
A/G MS-1 says he's not started the new AFS yet. Will do it soon.

2/07:56:00
MS-1 has put on new AFS but is reading BSR=lo no time for doing the mal. But, it is pulling tape.

2/08:10:00
OCR #AFT-004 voiced up for MS-1 to perform diagnostic prior to pre-sleep.

2/10:00:00
Heard on loop that MS-3 was still in S/L. (still collecting data?)

2/10:36:00
A/G AFT change (removal) was done. MS-3. So we're not collecting data now but Bill's (MS-3) still in the module working RAHF mals.

2/10:44:00
Note: (not directly related to AFT.)
PS-F (Wang) still in module - asking about trouble-shooting ideas for DDM, (probably not recording AFT anymore.) He'll probably stay up late tonight if a fix to his experiment is possible. Heard that info won't come up to him for another 3 or 4 hours.

2/11:01:00
We hear PS-M talking to FES A/G - sounds good! No mals reported for AFT so we assume all's ok.

2/11:40:00
POD recommends PS-F to go off shift - to resume IFM (DDM) on next Gold Shift.

Silver Shift

2/12:43:00
CIC calls to say MS-1 reported about 20 min ago he found display was static, did not perform mal, and he removed the AFS. He found this problem at end of his shift when preparing to remove AFS. This is confusing because as a control he normally sees no numbers, so must have been attempting a mal procedure.

2/13:00:00
Called to ask for tape replay of A/G message re MS-1 display problem. Found that Thagard had reported for Lind that Lind had seen at time of removal of his AFS, just prior to the end of his shift, that the wrist display was frozen, but the tape was still running. A MAL was not performed.
The message leaves unclear what was ment by a "frozen" display. It could mean:
(1) All display numerals are on and unchanging.
(2) BSR display remained at low.
(3) T,X,Y or Z remains.

2/15:14:00

PS-M is wearing AFS and headset on TV. He used normal quick head movements and flew about spacelab as needed without restraint and with no apparent ill effects.

2/18:00:00
PS-M is again busily working space lab. Confirm his near-earthly speed of movement.

2/20:20:00
MS-3 is in lab. AFS was not seen on him. He is not scheduled to be up yet.

2/21:00:00
Called Herbie to review options on MS-1's: (1) replace wrist display; (2) do nothing; (3) give Lind trouble shooting instructions; (4) stow equipment. Not possible to communicate with MS-1 in mid-deck, according to OC, so can't do guided troubleshooting while he is still in middeck. Considered ORC for sending up suggestions of what to try to undo display freezing, but decided not to do so because power off - power on is a mal for display freeze or blank. The freeze observed may be corrected when Lind turns on power at start.

2/22:16:07
Don Lind reports that "all was working Ok, so Pat Cowings should be happy."

2/22:27:00
PS-F and MS-1 both have full AFS equipment. MS-3 does not have AFS. Correction MS-3 is wearing garment but was disconnected headset which is floating free in spacelab. AFS not in view. Note: according to PCAP, this TV was observed while MS-3 should have been donning AFS.

2/22:31:00
Good shot of Lind wearing headset with accel. closeup.

2/03:34:00
Don Lind says that "Thornton's modification of headset" didn't work - still was painful. He found he had to move the headset around to spread the pain.

2/23:38:00
I called CIC on OC loop to acknowledge Lind's message and ask about what modifications Thornton made. CIC didn't know. Can go hear audio tape at CIC during LOS:

3/01:21:00
Live TV form module. MS-3 and MS-1 have on AFS hardware. Also see PS-F with hardware. Can't tell if MS-3 has on AFS headset.

3/01:43:00
Observed PS-F remove AFS to begin IFM on DDM. Observe that PS-M still in module (not wearing AFS). He's apparently sight seeing.

3/03:59:00
Told CIC that PS-F is scheduled for tape change-out at approx. 3/4:10:00. If he can't get to it then (i.e., is still doing DDM IFM) then whenever he does put it back on, change tape to 3B and do diagnostic. Please call down so we know when it was done.

3/05:33:00 approx.
Cheers! from both SL and POCC. PS-F fixed DDM. We will wait to hear when AFT has been re-activated. Reminded OC to voice this up to Taylor.

3/06:07:00
MS-3 did cassette change. Reported that resp. (chest) transducer too loose. This was the crewman's fault because of modifications made to the garment one day prior to launch. OCR #AFT-005 being sent to OC - shorten chest transducer with tapes.

3/06:26:00
On TV/ops noticed MS-3 has accel on right ear. This changes orientation of the

accelerometer (forward now backward). Ask post flight where he wore it during most of mission so we can interpret these data.

3/06:42:00
APS told PS-F to put on AFT ASAP.

3/06:54:00
OC called Bill (MS-3) with OCR #AFT-005 (shorten chest resp transducer with tape). He said "in work."

3/09:27:00
PS-F observed wearing AFS during video downlink. Accel/headset in place.

3/11:30:00
PS-F is still in S/L. We assume the AFT hardware is being worn.

3/14:00:00
PS-M observed on video wearing AFS hardware. He looks and sounds well.

3/16:42:00
PS-M reported that he activated AFS at MET 2/11:30:00 instead of the scheduled 2/10:00:00 in PCAP. Cassette tape changeout was also accomplished prior to scheduled time. Tapes 3A and 3B will have approx. 10 hrs recorded data.

3/18:24:00
Video shot of PS-M vacuuming rat cages during food changeout. Wearing accel. with face mask. Wearing gloves.

3/19:12:00
PS-M informed POD that PCAP does not show AFT on MET day 4 -- Silver Shift. He wanted to know what to do with tapes 4A and 4B. POD was informed that we had an approved RR which requested data recording for him on MD4.

3/19:37:00
PS-M translates thru tunnel with the greatest of ease. AFS hardware does not appear to interfere with this activity.

3/20:45:00
APS voice unlink of RR to PS-M. Don AFT equipment 4/10:15 - 11:00; cassette change 4/17:25 - 17:30; AFT removal 4/20:30 - 20:45.

3/22:21:00
Monitoring A/G we hear that all 3 crewmen are in module. No negative report on AFT so assume donning and battery replacement were nominal.

3/22:32:00
We see Taylor on TV and Don, they have on AFT. Also see Bill's wearing AFT.

3:22:41:00
MS-3 says garment today fits better so transducer modification wasn't necessary. He'll wear the head-set as long as he can. (Note Herbie says he may have, by mistake, modified one of MS-3's garments preflight instead of MS-1's. MS-1 had to have his transducers shortend and taped prior to launch.)

3/22:55:00
MS-1 called down to say "Pat Cowing's has me so well trained I got up and put on my AFS and did the battery change an hour before it was called for on the PCAP."

4/02:11:00
Overheard MS-1 refer to removing AFT for better manuverability in the tunnel while filming for TV-20 - will get clarification from OC. OC says that TV-20 was canceled so out AFT hardware won't be removed.

4/03:11:00
MS-3 indicated that his cassette tape change-out may be delayed because DSO437 takes so long. Ok by us.

4/4:52:00
MS-1 reported he would be approx. 20 min. late on tape changeout. MS-3

reported some problems with unit. He would work mal procedures though it would take about one hour.

4/6:13:04

MS-1 reported he conducted his tape changeout and diagnostic at 6:10. MS-3 reported he executed his mal, performed tape changeout, but "could no longer put up with AFT headset." Unit was performing correctly. MS-1 reported that "display was frozen as usual prior to tape changeout, but system came up properly.

(I believe I may understand "frozen display" issue.) H. Finger

4/7:43:00

Submitted OCR #AFT-006 for PS-M not to change battery.

4/7:47:00

MS-3 said, following UMS ops. AFT undergarment is in the Spacelab trash(?)

4/10:16:00

MS-3 reported that all AFT procedures completed nominally.

4/11:32:00

MS-1 reported that he is going off shift. We assume AFS equipment was on up until now.

4/11:46:00

PS-M observed in S/L module wearing all AFT hardware but without display. Nominal ops.

4/21:00:00

Silver off shift.

6/16:36:00

AFT back on console - awaiting deorbit prep.

6/20:25:00

No message re: AFT activity. We are gone to California....with a banjo on my knee....

Enclosure 4

Summary Pages on Quantity/Quality of Flight Data

PSF

PERCENT OF DATA ANALYZABLE

TAPE ID	CASSETTE	ECG	BVP	ABD	BSR	TOTAL MIN OF DATA
005	0A	98.09	25.31	57.98	98.54	366 launch
006	0B	99.56	37.27	87.38	100.00	226.6
007	1A	99.34	30.77	98.52	99.96	431
008	1B	99.87	42.59	99.94	100.00	265
017	2A	76.46	8.27	57.48	99.89	333.33
	2B	NOT RECORDED				
028	3A	97.98	8.43	74.43	98.71	467.34
	3B	NOT RECORDED				
029	4A	95.76	0	47.09	100.00	467.0
	4B	NOT RECORDED				
030	6A	95.82	0	50.63	100.00	39.5 re-entry
						2595.77 (43.26 hrs)
AVERAGE		95.36	19.08	71.68	99.64	

PSM

PERCENT OF DATA ANALYZABLE

TAPE ID-CASSETTE		ECG	BVP	ABD	BSR	TOTAL MIN OF DATA	
		LAUNCH TAPE NOT READABLE					
009	0A	97.17	39.61	61.12	99.44	360	
	0B		NOT RECORDED				
010	1A	99.70	34.76	98.20	100.00	344	
011	1B	99.17	37.08	100.00	100.00	305	
018	2A	99.95	35.15	51.24	98.51	373	
019	2B	99.65	39.74	77.48	99.51	339	
023	3A	99.25	25.69	82.14	100.00	373	
024	3B	97.35	14.99	88.97	99.84	322	
025	4A	97.99	22.96	43.84	100.00	396	
026	4B	93.68	16.03	56.76	100.00	238	
027	6A	97.80	72.18	94.75	93.98	61	re-entry
						3111.0 (51.85 hrs)	
AVERAGE		98.17	33.82	75.45	98.63		

MS1

PERCENT OF DATA ANALYZABLE

TAPE ID-CASSETTE		ECG	BVP	ABD	BSR	TOTAL MIN OF DATA	
Ø12	ØA	97.24	50.7Ø	99.6Ø	1ØØ.ØØ	2Ø1.3	launch
	ØB	NOT RECORDED					
Ø14	1A	98.78	23.18	25.43	1ØØ.ØØ	4Ø2.5	
Ø13	1B	98.37	14.8Ø	46.64	1ØØ.ØØ	342	
	2A	NOT RECORDED					
Ø2Ø	2B	98.24	Ø	73.11	1ØØ.ØØ	172.5	
Ø21	3A	98.65	Ø	42.3Ø	1ØØ.ØØ	465.5	
Ø22	3B	98.81	Ø	54.31	1ØØ.ØØ	2Ø4	
Ø35	4A	98.95	Ø	8Ø.26	85.94	468	
Ø36	4B	98.31	Ø	9Ø.32	97.Ø1	3Ø1	
						2556.8	(42.61 hrs)
AVERAGE		98.42	11.Ø9	63.99	97.87		

MS3

PERCENT OF DATA ANALYZABLE

TAPE ID-CASSETTE	ECG	BVP	ABD	BSR	TOTAL MIN OF DATA
001 0A	40.72	22.02	99.53	99.74	390.6 launch
002 0B	4.35	16.06	100.00	100.00	391.
003 1A	98.99	0	38.97	100.00	267.3
004 1B	99.25	0	58.02	96.12	430.66
015 2A	99.66	20.92	82.50	99.11	300
016 2B	99.91	25.59	28.99	98.14	377.5
031 3A	99.09	5.90	76.32	99.67	409.66
032 3B	99.11	2.35	65.56	100.00	315.3
033 4A	100.00	4.09	94.27	100.00	146.6
034 4B	99.36	0	23.11	100.00	240
					3268.62 (54.48 hrs)
AVERAGE	84.01	9.70	66.73	99.28	

Enclosure 5

Minutes of Flight Rediness Review

National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, California 94035

NASA

Reply to Attn of: EE:213-2/AFT-55

April 25, 1985

FOR THE RECORD

FROM: Herb Finger, AFT Experiment Manager

SUBJECT: Summary of AFT SL3 Flight Readiness Review

The Autogenic Feedback Training Experiment conducted a Flight Readiness Review of its Spacelab 3 flight experiment on Monday, April 22, 1985. Dr. P. Cowings and Mr. H. Finger discussed details concerning the status of the hardware, including a review of modifications to the hardware since DSO #442 and outstanding NCR's, status of crew training activities, plans for mission activities, and concerns and risks.

Two items of note were discussed at this meeting and have been resolved. Some concern was raised regarding the marginal condition of Battery Pack 1006 with regard to isolation. While the battery is NOT being used on SL3, there was concern that the problem with the battery, yet unknown, could be generic in nature and appear in other units during the mission, creating a safety hazard. An action was taken by Code E to evaluate this problem and assess the probability of such an occurrance. The problem has since been evaluated by Sal Rositano and Bob Lee of Code E and the failure has been found to be due to improper sealing during refurbishment. The problem is not generic, and since each battery has been checked for proper isolation just prior to shipment to JSC/KSC, no occurrance of this problem is predicted with flight units.

The second item concerns the disjointed training schedule as a result of slips in launch dates. Dr. Cowings indicated that though each of the crew had participated in the entire number of training sessions, the delays in launch date had stretched this training over 4 or 5 months, rather than the 2 to 3 initially proposed. Furthermore, requests for supplemental training to offset the negative effects of this extension had been left to the crew's discretion, and that only three of four payload specialists (prime and alternates) had requested additional training. In all cases, but in particular in the case of the remaining PS, progress of the crew in controlling their autonomic responses under the elongated training program was not as effective as with other subjects who had been trained using the original scheme of training. The PI team will insist, in future missions, for a training schedule more in line with that initially proposed during the experiment definition phase of the program.

With the closing of these items, the flight readiness review panel recommends that AFT proceed with Spacelab 3 Experiment 3AFT23.

Prepared by: Herbert J. Finger — 4/26/85

Herbert J. Finger
AFT SL3 Experiment Manager

Date

Concurrence: for Dr. Patricia Cowings — 4-25-85
AFT Principal Investigator — Date

Concurrence: Dr. Salvador Rositano — 4-25-85
Asst. Chief, Systems Engineering Div. — Date

Concurrence: William E. Berry — 4/27/85
Chief, Life Science Flight Projects Office — Date

Concurrence: Dr. Joseph C. Sharp — 4/27/85
Deputy Director for Space Research — Date