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STS-41B National Space Transportation Systems Program Mission Report

March 1984

National Aeronautics and
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Lyndon B. Johnson Space Center
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STS-41B

NATIONAL SPACE TRANSPORTATION SYSTEMS PROGRAM

MISSION REPORT

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INTRODUCTION AND MISSION OBJECTIVES

The STS-41B National Space Transportation Systems Program Mission Report contains a summary of the major activities and accomplishments of the sixth operational Shuttle flight and fourth flight of the OV-099 vehicle, Challenger. Since this flight was the first to land at Kennedy Space Center, the vehicle was towed directly to the OPF (Orbiter Processing Facility) where preparations for flight STS-41C, scheduled for early April 1984, began immediately. This report also summarizes the significant problems that occurred during STS-41B, and provides a problem tracking list that is a complete list of all problems that occurred during the flight. None of the problems will affect the STS-41C flight.

The major objectives of flight STS-41B were to successfully deploy the Westar satellite and the Indonesian Communications Satellite-B2 (PALAPA-B2); to evaluate the MMU (Manned Maneuvering Unit) support for EVA (Extravehicular Activities); to exercise the MFR (Manipulator Foot Restraint); to demonstrate a closed-loop rendezvous; and to operate the MLR (Monodisperse Latex Reactor), the ACES (Acoustic Containerless Experiment System) and the IEF (Isoelectric Focusing) in-cabin experiments; and to obtain photographs with the Cinema 360 Cameras.

The as-flown timeline for the STS-41B flight is shown in figure 1 at the end of the report. The sequence of events for this flight is shown in table I. The problem tracking lists for the MSFC (Marshall Space Flight Center) elements and Orbiter are shown in tables II and III, respectively, also at the end of the report.

MISSION SUMMARY

The STS-41B flight was launched from Launch Complex 39 at KSC (Kennedy Space Center) on February 3, 1984, at 034:12:59:59.998 G.m.t. (06:59:59.998 a.m. e.s.t.), and landed at the KSC Shuttle Landing Facility at 07:16 a.m. e.s.t. on February 11, 1984. This flight ended with the completion of one of the last major test objectives of the program, that of landing at the Kennedy Space Center. The precision with which this objective was accomplished showed that all areas of the National Space Transportation System Program were at their peak of readiness for completing this objective.

The crew for this flight was Vance D. Brand, Commander; Lt. Commander Robert L. Gibson, Pilot; and Capt. Bruce McCandless II, Ronald E. McNair, Phd., and Lt. Col. Robert L. Stewart, Mission Specialists. Of the 32 DTO's (development test objectives) and DSO's (detailed supplementary objectives), 29 were completed for a 91 percent completion rate. The failure of the IRT (integrated rendezvous target) to inflate after deployment resulted in one and one-half of the three DTO's not being accomplished; thus resulting in the cancellation of the rendezvous exercise. Also one-half of the DTO concerning MMU operations with the deployed SPAS (Shuttle pallet satellite) could not be accomplished because the RMS (remote manipulator system) failure prevented the SPAS deployment. The third DTO not completed was the closed circuit television laser ranging test which was also to be completed using the inflated IRT.

The ascent phase was normal in all respects, as was the ET (external tank) separation and the two OMS (orbital maneuvering system) maneuvers that placed the vehicle in the planned 165-nmi. circular orbit. The SRB's (solid rocket boosters) were recovered along with their parachutes. The ET impacted within the planned footprint.

TABLE I. - STS-41B SEQUENCE OF EVENTS

EVENT	Actual G.m.t.
APU activation (1)	034:12:55:10
(2)	034:12:55:12
(3)	034:12:55:13
SRB HPU activation command (RH-B2)	034:12:59:32.7
MPS start command sequence (engine 3)	034:12:59:53.4
SRB ignition command from GPC (lift-off)	034:12:59:59.998
MPS throttledown to 73 percent thrust (engine 3)	034:13:00:29.4
MPS throttleup to 100-percent thrust (engine 3)	034:13:01:00.8
Maximum dynamic pressure	034:13:01:07.0
SRB separation command	034:13:02:08.6
MPS throttledown for 3g acceleration (engine 3)	034:13:07:50.1
Main engine cutoff (MECO)	034:13:08:41.76
External tank separation	034:13:09:00
OMS-1 ignition	034:13:10:41.8
OMS-1 cutoff	034:13:13:12.0
APU deactivation (APU 3)	034:13:14:43
OMS-2 ignition	034:13:45:24.8
OMS-2 cutoff	034:13:47:29.8
Westar/PAM satellite deployment	034:20:59:00
OMS-3 ignition (separation firing)	034:21:13:53.2
OMS-3 cutoff	034:21:14:06.2
OMS-4 ignition (orbit adjust firing)	036:10:23:23.2
OMS-4 cutoff	036:10:23:54.4
Integrated rendezvous target deployed/failed	036:11:51
PALAPA/PAM satellite deployment	037:15:13:16
OMS-5 ignition (separation firing)	037:15:28:16.2
OMS-5 cutoff	037:15:28:28.6
Start first extravehicular activity	038:12:10
End first extravehicular activity	038:18:05
Start second extravehicular activity	040:10:24
End second extravehicular activity	040:16:41
OPS-8 (flight control system) checkout	041:08:58:59
APU 2 activation	042:11:11:19
Deorbit maneuver ignition	042:11:16:15.2
Deorbit maneuver cutoff	042:11:19:03.4
APU 1 and 3 activation	042:11:32:27
Entry interface (400,000 ft)	042:11:45:12
End blackout	042:12:01:29
Terminal area energy management	042:12:09:30.2
Main landing gear contact	042:12:15:55
Nose landing gear contact	042:12:16:06
Wheels stop	042:12:17:02
APU deactivation complete	042:12:31:08

The first day of the STS-41B flight progressed satisfactorily with data being obtained on all seven planned DTO/DSO's. Only minor anomalies occurred, none of which had any impact on the successful completion of the flight. In addition, the Westar Communications Satellite was deployed as planned at 34:20:59:00 G.m.t. The Orbiter was separated from the satellite and the Westar perigee burn was performed. The Westar satellite did not achieve the planned geosynchronous orbit. It is now in a 162- by 656-nmi. orbit. As a result, the PALAPA-B Indonesian satellite deployment was delayed 2 days in an effort to understand the Westar situation.

On the second day, the IRT balloon did not inflate after deployment. As a result, the rendezvous exercises were cancelled. Even though the balloon did not inflate, the crew was able to track the target to a range greater than 30,000 ft. and good short-range sensor data (Ku-Band radar, star tracker, and crewman optical alignment sight) were obtained which partially fulfilled the planned short-range DTO. The long-range-rendezvous objective, the atmospheric drag profile of the balloon as it slowed and entered, and the CCTV laser ranging test could not be accomplished because of the IRT failure.

On the second day, the cabin pressure was lowered to 10.2 psia in preparation for the two EVA's. Lowering the cabin pressure reduced the required prebreathing time prior to the two EVA's from 3 hours, as on a previous mission with 14.7-psia cabin pressure, to 1 hour. All subsystems in the cabin area functioned satisfactorily during the 72-hour period of lower pressure.

The third day was devoted primarily to conducting experiments, both those in the cabin and in the payload bay, and preparing for the first EVA. DTO 0705, the Shuttle Launch Configuration Communications Test that involved encrypting and decrypting voice and data, was performed smoothly.

The decision was made by the Indonesians to deploy their satellite (PALAPA-B) on the fourth day of the mission. The satellite was deployed on time and at the proper attitude. The PALAPA-B also did not achieve its desired orbit and is in approximately the same orbit (639 by 148 nmi.) as the Westar.

The fifth day was highlighted by the completion of a very ambitious EVA during which man, for the first time, separated from the orbiting vehicle without tethers, and, using the MMU, traversed to distances as far as 320 feet from the Orbiter. The two crewmen were able to perform the planned tasks during the EVA plus remove CCTV camera D for inflight maintenance within the cabin and subsequent reinstallation during the second EVA. Operations with the MMU were successful. Some difficulty was experienced by one of the crewmen in locking himself in the various foot restraints. Another difficulty occurred during EVA communications when the crewmen had to speak louder than normal to energize the VOX (voice-operated) microphone. All objectives associated with the first EVA were accomplished.

The sixth day was devoted to in-cabin operations, obtaining data from various experiments, and preparing equipment for the EVA planned for the seventh day. Various experiments on the SPAS-01 in the payload bay were also performed and data obtained. All planned DTO's and DSO's were completed on the sixth day.

A significant problem of the STS-41B mission developed on the morning of the seventh day during checkout of the RMS prior to EVA. The arm operated properly except for the wrist joint. The joint would not move when commanded, although it had operated properly during the first EVA. The crew attempted to recover use of the arm by performing ground-suggested procedures, but all attempts failed to activate the wrist joint. The arm was recradled and all RMS and deployed SPAS operations planned for the second EVA were cancelled.

The second EVA, although replanned because of the above activities being cancelled, was still successful. The crew performed MMU docking operations with the SPAS, even though the SPAS was not deployed. The crew also retrieved a foot restraint that had come loose, repaired the slide wire linkage that was also loose, and re-installed CCTV camera D.

The crew spent the final full day in orbit completing three DTO/DSO's plus parts of the experiment data gathering still required. The crew also stowed the vehicle for entry the next morning. The crew completed all preparations for entry on the final day and at 042:11:16:15 G.m.t., the 168-second deorbit maneuver was performed as planned. The entry was normal in all respects and all scheduled PTI (programmed test input) maneuvers were performed. After completing the HAC (heading alignment circle) turn angle of 301 degrees, the Orbiter was guided to the KSC Shuttle Landing Facility for the first time. The Orbiter landed on runway 15 approximately 2000 feet from the beginning of the runway. Rollout required approximately 10,800 feet with the Orbiter stopped approximately 2,200 feet from the end of the runway.

The left OMS pod TPS received damage during entry such that a burn-through occurred. All other TPS tile damage was consistent with previous flights.

VEHICLE ASSESSMENT

SOLID ROCKET BOOSTERS

The performance of the SRM's (solid rocket motors) was well within the specification limits. Quick-look evaluation shows that head pressures and propellant burn rates were very close to those predicted for both motors. The separation times for both SRM's were as predicted. Operation of both SRB TVC (thrust vector control) systems was satisfactory and no anomalies were experienced. Postflight inspection showed that no hydrazine leaks occurred.

Review of data shows that all SRB power from the Orbiter was within specification. The rate gyro performance was also within specification. Rate gyro C (serial number 29) had a slight deviation in tracking compared with the other rate gyros, but this deviation was well within specification.

The decelerator subsystems on both SRB's performed normally with the exception of one main parachute on each SRB that failed to inflate. An investigation team has been established. Table II contains a current anomaly list for the SRB's.

EXTERNAL TANK

All prelaunch requirements were met with no LCC (launch commit criteria) violations. ET separation and entry were as predicted, tumble was confirmed, and impact was within the footprint.

The prelaunch thermal environment was as expected. The TPS (thermal protection system) experienced only minor ice/frost buildup in areas that had approved waivers prior to flight.

MAIN PROPULSION SYSTEM

Liquid oxygen and liquid hydrogen propellant loading for the MPS (main propulsion system) was completed satisfactorily. Purge requirements prior to and during loading were met. Aft compartment hazardous gas concentrations were well within limits. Propellant preconditioning was satisfactory; all interface pressures and temperatures were met and all SSME (Space Shuttle Main Engine) prestart requirements were satisfied.

The engine start buildups and transitions to mainstage were normal. Engine operation and performance during mainstage appeared satisfactory. During steady-state performance, ET/Orbiter pressures and temperatures and Orbiter/SSME pressures and temperatures satisfied interface requirements. Quick-look mixture ratio and thrust values from the flight indicate repeatable engine performance. Power level throttling operation appeared normal. Engine shutdown was satisfactory. MECO (main engine cutoff) occurred approximately 0.1 second later than predicted.

Table II contains a current listing of anomalies that occurred within the SSME/MPS subsystems.

ORBITER

The overall performance of the Orbiter was satisfactory. A brief discussion of the significant anomalies is contained in the following paragraphs. A complete list of the Orbiter flight anomalies is contained in table III.

Auxiliary Power Unit

The APU (auxiliary power unit) gas generator water cooling system A failed off at 34:13:15:46 G.m.t. and system B was used successfully for the remainder of the mission.

The APU 1 gas generator injector temperature (V46T0174A) readout was erratic prelaunch and read 600 psia low at T plus 2 minutes - all other APU 1 parameters were normal. The lower limit was set to zero prior to entry and there was no impact on the mission.

APU 2 gas generator/fuel pump valve system A heater failed during prelaunch operations. System B heater was used for the entire flight with no impact to the mission.

Intercommunication Loop Noise

At 034:21:00 G.m.t., the crew reported continuous static noise on both the hardwired and wireless communication systems A and B. The crew isolated the problem to the WCCU (wireless crew communications unit) wall unit. There was no further mission impact.

Right RCS Thruster R3D Driver Discrete Failed

At 038:11:49 G.m.t., the R3D thruster (jet) driver discrete failed during a hot-fire test prior to the first EVA. The thruster was still usable without mission impact.

Supply Water Dump Valve Failed To Open

At approximately 039:08:35 G.m.t., the supply water dump valve failed to open when commanded. The excess water was disposed of by operating the flash evaporator system. Later, during thermal conditioning using the dump nozzle heaters and after one revolution of Orbiter side sun, the valve was opened at 40:05:39 G.m.t. The supply water continued to fail to dump, thus indicating line freeze up. Postflight, the water line was found ruptured upstream of the dump valve. Discoloration of the TPS indicated ice formation on both potable and waste water nozzles.

Ku-Band System

Two problems occurred within the Ku-Band system. The RF (radio frequency) power output went to zero during a crew sleep period. After the crew sleep period, the Ku-Band power was cycled to off, then back to on. This action reset the fault sensing logic. The RF power output was recovered and remained nominal for the remainder of the mission.

Second, the Ku-Band failed the self-test initially and would not lock up on extravehicular crewman 1 during the initial activities of the first EVA. A manual search mode was used during the second EVA and a successful lock-on of extravehicular crewman 2 was completed with subsequent nominal performance.

Right RCS Vernier Thrusters R5R And R5D Failed Off

On two occasions (039:21:36:41 G.m.t. and 040:10:56:58 G.m.t.), RCS vernier thrusters R5R and R5D both failed off. The thrusters were turned off for the remainder of the mission after the second failure.

RMS Wrist Yaw Joint Failed In Primary System

At 040:09:23:33 G.m.t., the RMS wrist yaw joint failed in the primary system. During maneuvering to grapple the SPAS, a command was sent to the wrist yaw joint (Orbiter unloaded - RMS mode). The joint failed to move and the comm scan failure alarm was annunciated by the BITE (built-in test equipment). The crew verified the failure. The ground directed the crew to cycle power to the RMS to clear the failure indication. When power was reapplied to the arm, the failure indication reappeared, thus indicating a hard failure. As the joint was in position to be cradled, the crew was directed to cradle it. All RMS-SPAS operations for the EVA were cancelled.

EMU TV Failed

At 040:10:56 G.m.t., the battery-powered EMU TV camera failed to come on. The crew substituted verbal comments in cases where TV recording was planned for the MMU thruster firings and for the Freon transfer experiment.

TV Camera Failures

At 040:14:08 G.m.t., the RMS elbow TV camera lost focus and a loose object was observed in the lens. Payload bay cameras A and C were used for the MMU evaluation tests. Also, CCTV camera D lost the tilt function and was slow to pan. In addition, the color wheel was stuck. Inflight maintenance was performed, substituting a cabin TV for payload bay camera D. The color wheel problem was resolved; however, the pan and tilt functions were not recovered.

EXTRAVEHICULAR ACTIVITY

SUMMARY

The EVA's were completely successful with all summary objectives met. Two of the DTO's were modified due to the failure in the RMS and the EMU TV. The EMU experienced five sublimator high-pressure messages, three on the EMU-2 suit and two on the EMU-1 suit. These conditions were corrected by standard flight procedures. The SESA (special equipment stowage assembly) foot restraints came loose from their clamp. They were installed at KSC prior to launch and torqued to the required specifications. Why they came loose, is not known, but the crew was requested to safety-tether them prior to entry. The hydrazine transfer demonstration experiment was successfully performed, but a commercial QD (quick disconnect) appeared to be frozen. The experiment was essentially completed and a postflight inspection will determine if any internal leaks exist.

FIRST EVA

An ambitious first EVA was successfully accomplished. The EMU and EVA hardware worked satisfactorily. The crew were able to concern themselves with the task at hand without having to concern themselves with EMU operation. Some nuisance-level anomalies were noted as follows.

During the preparation for EVA in the airlock, static was noted on the communication channels while in the RF mode. This distraction was alleviated by going to hardline mode.

During EVA preparations, the crew experienced difficulty attaching the EVA checklist to the EMU arm. An inflight repair was accomplished to lock the restraining screw and no further difficulties were noted.

Just prior to egress, Astronaut Stewart received a sublimator pressure caution-and-warning message. The pressure rose to 4.0 psi at which point the warning alarm was tripped. The sublimator was turned off and restarted per flight procedures. After this restart, proper operation was observed during the rest of the EVA. All EMU operations were nominal.

The MMU system performance was nominal. The crew reported a "chatter" during +X translations. Since there is an offset of approximately 0.6-inch between MMU geometric center-of-thrust and the MMU system center-of-mass, a positive pitch motion while translating in the +X direction is induced. If attitude hold is on during translations, the attitude-hold logic is working to maintain very low pitch rates by cutting off two of the four thrusters which fire to produce +X translation. The control electronics assembly is cycling between commanding 4 and 2 thrusters extremely rapidly, hence the chatter.

SECOND EVA

System performance during the second EVA was nominal. Docking with the rotating SPAS was not achieved due to RMS problems. Failure of the EMU TV required substitution of verbal comments from crewman for thruster firings in lieu of visual cues during MMU engineering evaluation tests. Stewart had foot restraint problems similar to those experienced on the first EVA. Again, the problems did not deter the crew from keeping to the timeline.

RENDEZVOUS AND RANGING

As a result of the failure of the IRT to inflate, the rendezvous was cancelled. On the day of the target release, the target was tracked, and good sensor data was received from distances beyond 30,000 feet using the Ku-Band rendezvous radar, the crewman optical alignment sight, and the star tracker. These data were used to make manuever calculations, but the maneuvers were not performed. The short-range DTO was scored as 50 percent accomplished, based on the data collected.

Attempts to track the target on the day after release were totally unsuccessful and the long-range DTO was scored as zero accomplished.

The postflight processing of the downlinked relative vehicle tracking data may be significantly impacted because of multiple objects in the sensor field-of-view and unknown target characteristics caused by the IRT failure, and also because of downlink data transmission problems.

CREW EQUIPMENT

The crew equipment operated satisfactorily in performing the required functions. The galley and personal hygiene station were operated satisfactorily and enabled the crew to complete their eating and personal hygiene functions more efficiently. One problem, still very prevalent as it has been on previous missions, is trash management. The crew suggested that incorporating trash exercises in long-duration simulations may be helpful in resolving the problem. The crew also suggested that more jettison stowage bags be supplied. Also, difficulty was experienced when opening and closing stowage lockers on the middeck. The crew suggested that various design fixes be flown in an effort to find one that will resolve this problem.

PAYLOADS AND EXPERIMENTS

WESTAR SATELLITE

The Westar satellite was deployed at 034:20:59:00 G.m.t. (within 1 second of the planned time). The deployment was nominal in all respects with CCTV video covering the deployment. The Orbiter performed a nominal separation maneuver and the Westar PAM-D perigee motor ignited on time 45 minutes after deployment. The Westar satellite achieved a 656- by 162-nmi. orbit instead of its planned geosynchronous orbit. The cause of this situation is being investigated by the Westar contractors. All aspects of the Orbiter operation for this deployment were normal.

INDONESIAN (PALAPA-B) SATELLITE

The deployment of the PALAPA-B satellite was delayed until the fourth day so that preliminary analysis of the Westar situation could be made prior to committing the PALAPA-B to deployment.

The PALAPA-B was deployed at 037:15:13:16 G.m.t. (within 1 second of the planned time). Video coverage showed the deployment to be nominal in all respects. The PALAPA-B achieved approximately the same orbit (639 by 148 nmi.) as the Westar. An investigation of both situations is being conducted. All aspects of the Orbiter operation for this deployment were nominal.

INTEGRATED RENDEZVOUS TARGET

The IRT deployment occurred as planned at 036:11:51 G.m.t. However, shortly after deployment, the crew reported that it appeared that the staves which held the balloon in a compact manner had not separated as planned. Because the staves did not separate, the balloon could not inflate properly and instead of becoming spherical, took on the appearance of a two-sided (black and silver) piece of cloth. The crew also reported that the 200-pound weight may have separated from the cloth; however, later reports indicated the weight and material were still intact as one piece. As a result of the debris potential during the final phases of rendezvous and proximity operations, the rendezvous was cancelled.

The IRT was developed to provide a radar and visual target of known characteristics for use in calibrating the Ku-band rendezvous radar, developing STS rendezvous techniques, and determining drag characteristics at orbital altitudes.

ISOELECTRIC FOCUSING

The preliminary postflight data from the IEF (Isoelectric Focusing) payload indicated that product-separation did occur, but not to the extent expected by the Principal Investigator. Photography internal to the IEF was excellent and was equivalent to ground-based data collected preflight. No inflight anomalies occurred.

MONODISPERSE LATEX REACTOR

The latex spheres in one of the four internal reactors of the MLR (Monodisperse Latex Reactor) payload coagulated, thus losing the sample in that reactor. There were no inflight anomalies that indicated this product failed inside the reactor. The monodisperse latex spheres in the other three reactors did grow and are considered acceptable.

ACOUSTIC CONTAINERLESS EXPERIMENT

The ACES (acoustic containerless experiment system) had a damaged glass sample when the ACES was disassembled after the flight. A review of the video data indicates that the sample probably had escaped from the cage during launch. Video tape indicates the presence of the samples several times and that they were acoustically controlled for some time during the melted phase. Several other phenomena occurred internal to the ACES that will require further investigation before future ACES flights. One of these is the outgassing of a vapor product inside the oven chamber onto the video camera lens system. Another is that the rate of increase in the chamber and sample temperature inflight was less than expected. The last phenomenon is that during the time the sample was in the melted phase, it received additional energy from an unknown source which excited the sample and caused it to exit from the low-pressure well in the center of the acoustic chamber.

AUTONOMOUS PAYLOAD CONTROLLER

This modified APC (autonomous payload controller) worked extremely well in providing commands to the GAS (getaway special) experiments and Cinema 360 camera in the payload bay. The standard controller was not used.

GETAWAY SPECIALS

The five GAS (getaway special) experiments flown on STS-41B were:

1. G-051 - sponsored by General Telephone (modified optical and electrical properties of arc discharge)

2. G-349 - sponsored by Goddard Space Flight Center and R. MacIntosh (atomic oxygen erosion)

3. G-309 - sponsored by the United States Air Force and J.Adolphson (comic ray upset experiment)

4. G-004 - sponsored by Utah State University (thermocapillary flow in liquid columns, capillary waves on water, and spore growth experiment)

5. G-008 - sponsored by AIAA and Utah State University (soldering experiment, protein crystallization, and seed germination)

The initial reports indicate that experiments G-051, G-399, and G-309 operated properly. No report has been received on G-004 and G-088.

CINEMA 360 CAMERA

The Cinema 360 Camera System was successfully flown in the cabin and in the payload bay. Both cameras operated flawlessly and produced excellent film.

The in-cabin version was a specially adapted Arriflex 35mm Model III camera to which was mounted a Nikon 8mm/f 2.8 fisheye lens and a 400-foot film magazine. The fisheye lens enabled the camera to film activity within a field of view that was 180 by 360 degrees. The camera recorded the crewmen engaged in performing daily routines associated with flying the spacecraft, payload handling and deployment, and other in-cabin housekeeping activities.

The payload bay camera was identical to the in-cabin camera except that it used a 1000-foot magazine and was mounted in a modified GAS canister. The modified GAS canister had a precision-machined lid that housed a quartz dome for the fisheye lens to look through, and electronics that allowed the crew to remotely change f-stop, frame rate, plus operate the camera. This camera was used to capture footage of EVA's, payload deployment, and RMS deployment.

SHUTTLE PALLET SATELLITE

The SPAS (Shuttle pallet satellite) experiments, for the most part, performed very well. The SPAS mass spectrometer swivel-frame microswitch failed and the swivel frame would not stay in the +X position when commanded. A microswitch adjustment was made during EVA 1 and partial capability was restored. However, control of the swivel was from the ground with visual verification of mass spectrometer frame position verified each time via ground-controlled live TV. The mass spectrometer status readout was invalid.

At approximately 05:19:40 MET, the SPAS was taken off Orbiter power and reactivated for RF functioning with the mass spectrometer reactivated at 05:20:00 MET. This action was in preparation for RMS operations. Longeron trunnion temperatures at that time were 3.6 deg C on the starboard trunnion and 4.6 deg C for the port trunnion. On RMS checkout, the RMS wrist yaw joint experienced a hard failure and the RMS operations were aborted. The SPAS was left in the RF mode with the mass spectrometer on until the EVA was completed. Trunnion temperatures at EVA completion (06:03:35 MET) were -6.2 deg C and -1.5 deg C for the starboard and port SPAS trunnions, respectively. SPAS was returned to Orbiter electrical power at 06:03:49 MET and the heat pipe was turned on.

AERODYNAMIC COEFFICIENT IDENTIFICATION PACKAGE/HIGH RESOLUTION ACCELEROMETER PACKAGE

The ACIP/HiRAP (Aerodynamic Coefficient Identification Package/High Resolution Accelerometer Package) experiment is part of the Orbiter experiments supporting aerodynamic research programs in the flight environment.

The experiment was located beneath the rear payload bay liner in the wing carry-through structure, and was mounted on a special shelf to the left of the vehicle's centerline. The ACIP experiment hardware consisted of triaxial linear and angular accelerom-eters and rate gyros aligned to the Orbiter axes. HiRAP consisted of a triad of 1-micro accelerometers aligned to the ACIP accelerometers and combined with the ACIP data stream. These instruments sense the dynamic attitudes and vehicle performance during the launch, orbit, entry, and descent phases of flight, and provided an accurate determination of the aerodynamic coefficients for the Orbiter.

Preliminary investigation of ACIP/HiRAP data from STS-41B showed that all scientific sensors were active and operated nominally. The data indicated the occurrence of specific flight events; e.g., ascent, payload deployment, thruster-firings, entry maneuvers and touchdown.

High concentrations of data anomalies occurred in all channels during the warm-up period following ACIP turn-on before the deorbit maneuver. Further investigation will reveal if this presents a problem or if any action is required.

TABLE II.- SRB, ET, AND SSME ANOMALY LIST

MSFC STS-41B ANOMALY LIST — DATE: FEBRUARY 29, 1984

NO.	TITLE	TIME, G.M.T	COMMENTS	RESP. MGR.
1.	LH2 MAIN PARACHUTE FAILED TO INFLATE	034:13:06	ONE MAIN PARACHUTE ON THE LH SRB FAILED TO INFLATE. PARACHUTES HAVE BEEN DISASSEMBLED, INSPECTED AND REPACKED TO ELIMINATE POSSIBLE FAILURE MODES.	SRB K. HENSON EE11
2.	RH MAIN PARACHUTE FAILED TO INFLATE	034:13:06	ONE MAIN PARACHUTE ON THE RH SRB FAILED TO INFLATE. PARACHUTES HAVE BEEN DISASSEMBLED, INSPECTED AND REPACKED TO ELIMINATE POSSIBLE FAILURE MODES.	SRB K. HENSON EE11
3.	ME-1 AND ME-2 MAIN FUEL VALVE BURST DIAPHRAGM RUPTURE	POST FLIGHT INSPECTION	ME-1 MFV BURST DIAPHRAM IS KNOWN TO BE FROM A DEFECTIVE LOT. ME-2 MFV BURST DIAPHRAM HAS BEEN RETURNED TO ROCKETDYNE FOR FAILURE ANALYSIS.	SSME R. BLEDSOE EE21
4.	ME-2 OXIDIZER PREBURNER EROSION IN ASI CHAMBER AND INJECTOR FACE EXTENDING TO ROW A FOR 360 DEG	POST FLIGHT INSPECTION	UNDER INVESTIGATION. CONTAMINANT FOUND IN ASI FUEL SUPPLY LINE - RESTRICTING FLOW, ENGINE TO BE REPLACED WITH ENGINE 2020.	SSME R. BLEDSOE EE21
5.	ME-2 NOZZLE THERMAL PROTECTION SYSTEM OVERHEATING AND MELTING IN THE AREA OF THE AFT MANIFOLD	POST FLIGHT INSPECTION	SMALL AREA OF OVERHEATING AND MELTING EXPOSED THE NOZZLE METAL. RESULTS FROM HARDNESS CHECK INDICATE NOZZLE MATERIAL WAS NOT AFFECTED. ANALYSIS FOR FURTHER TPS PROTECTION IS UNDER WAY.	SSME R. BLEDSOE
6.	ME-3 HPOTP BLADE CHIPS	POST FLIGHT INSPECTION	TWO FIRST STAGE BLADE TIPS WERE CHIPPED. A TOTAL OF 37 TESTS FOR 10,376 SECONDS HAVE BEEN RUN ON GROUND TEST ENGINES WITH NO PROBLEMS. THE CHIPPED AREA IS NOT IN A HIGH STRESS LOCATION ACCEPTABLE FOR FLIGHT.	SSME R. BLEDSOE EE21 CLOSED
7.	HPFT STRUT CAN DAMAGE	POST FLIGHT INSPECTION	INSPECTION ENGINE 201[illegible] REVEALED A SMALL PIECE OF METAL BROKEN OUT OF ONE STRUT CAN SUPPORT IN THE HPFTP. HARDWARE FAILURES OF THIS NATURE HAVE OCCURRED ON GROUND TEST WITHOUT ANY IMPACT TO ENGINE INTEGRITY. THE TURBOPUMP WILL BE REPAIRED FOR CONTINUED USE.	SSME R. BLEDSOE EE21 CLOSED

TABLE II.- SRB, ET, AND SSME ANOMALY LIST (Concluded)

MSFC STS-41B ANOMALY LIST			DATE: FEBRUARY 29, 1984	
NO.	TITLE	TIME, G.M.T	COMMENTS	RESP. MGR.
8.	SRB CLEVIS JOINT O-RING BURN AREA	POST FLIGHT INSPECTION	COMBUSTION GAS PENETRATED THROUGH OR BY VACUUM PUTTY IN JOINT REGION AND PRODUCED SMALL BURN AREA ON PRIMARY O-RINGS AT THE LH SRB FORWARD TO FORWARD CENTER CLEVIS JOINT AND AT THE RH SRB NOZZLE AFT DOME INTERFACE.	SRB K. COATES EE11
9.	SRB RATE GYRO BENCH TEST FAILURE	POST FLIGHT TESTING	TWO RATE GYRO'S "A" AND "C", FROM THE RH SRB AND ONE RATE GYRO, "B", FROM THE LH SRB FAILED POSTFLIGHT TESTING. EVALUATION OF RATE GYROS WILL BE ACCOMPLISHED BY THE VENDOR.	SRB N. GILLINO EE11

TABLE III.- ORBITER AND GFE PROBLEM TRACKING LIST

JSC OV-099 STS-41B PROBLEM TRACKING LIST — MARCH 13, 1984

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
1.	APU GGVM H2O COOLING SYSTEM A FAILED OFF.	34:13:15:46	AFTER ASCENT COOLDOWN, APU COOLING IS NOT MANDATORY UNLESS FCS CHECKOUT OCCURS WITHIN ONE REV OF DEORBIT. ISOLATION VALVE STUCK. R&R. SUSPECT CONTAMINATION.	R. LANCE CAR 11F009 CLOSED 03/07/84
2.	INSTRUMENTATION FAILURES:			CLOSED 03/07/84
A	SSME 2 GH2 PRESSURIZATION OUTLET PRESSURE SENSOR (V41P1260A) FAILED.	34:13:02:44	SENSOR FAILED OFF SCALE HIGH ABOUT T+164 SECONDS. ALSO OCCURRED ON STS-6, 7 AND 8. R & R.	S. BAIRD CAR 11F001
B	APU 1 GAS GENERATOR INJECTOR TEMPERATURE (V46T0174A) 600 DEG F LOW.	PRELAUNCH & 34:13:02	TEMPERATURE ERRATIC PRELAUNCH AND DROPPED 600 DEG F LOW AT ABOUT T+2 MINUTES. READ ERRATIC DURING ENTRY. SUSPECT THERMOCOUPLE. R&R.	R. LANCE CAR 11F010
C	APU 3 GAS GENERATOR PRESSURE (V46P0320A) 100 PSIA HIGH.	34:12:55:12	STAYED HIGH ALL DURING ASCENT AND ENTRY. REPLACED WITH NEW APU FOR STS-41C.	R. LANCE CAR 11F007
3.	PAYLOAD BAY TV CAMERA D DID NOT TILT, WAS SLOW TO PAN AND THE COLOR WHEEL STUCK.	34:14:45:45	CREW REPORT. VIDEO DOWNLINK INDICATED COLOR WHEEL STUCK. CYCLED POWER SWITCH BUT NO EFFECT. REMOVED ON EVA 1. REPLACED ON EVA 2. STILL SLOW PAN AND NO TILT. R&R PAN & TILT ASSY AND CAMERA.	B. EMBREY FIAR RCATVA 2765F&2548F CLOSURE IN PROCESS
4.	WCS FAN SEPARATOR 1 DID NOT SPIN UP TO FULL SPEED AND STALL CURRENT WAS OBSERVED. SLINGER CB OPENED.	34:16:22	FAN SEPARATOR 2 OPERATING PROPERLY. T/S AT KSC. REMOVE AND REPLACE WCS. CB OPENED AT 39:17:10 G.M.T. REPEATED AT 1000 RPM POSTFLIGHT.	E. WINKLER CAR 11F002 CLOSURE IN PROCESS
5.	INTERCOM VOICE LOOP NOISE.	34:21	CREW REPORTED CONTINUOUS STATIC ON BOTH HARDWIRED AND WIRELESS SYSTEMS A AND B. CREW ISOLATED PROBLEM TO MID DECK AUDIO TERMINAL UNIT. NO PROBLEM ON HARD LINE LATER IN MISSION. T/S AT KSC.	O. SCHMIDT R. ARMSTRONG FIAR EE0577F

TABLE III.- ORBITER AND GFE PROBLEM TRACKING LIST (Continued)

JSC OV-099 STS-41B PROBLEM TRACKING LIST — MARCH 13, 1984

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
6.	LRCS FUEL PRIMARY REGULATOR A INTERNAL LEAK.	PRELAUNCH & ON-ORBIT	LEAKED 8000 SCCH. PREFLIGHT WAIVER. SECONDARY STAGE FUNCTIONED NORMALLY. PROBABLE PARTICLE CONTAMINATION. T/S AT KSC.	D. BLEVINS CAR AC6471F CLOSED 03/07/84
7.	L OMS POD OX TANK AFT AND TOTAL QUANTITIES (V43Q4232C) & (V43Q4231C) FAILED.	36:10:23:38	FAILED TO 0.7% AND 4.8% RESPECTIVELY DURING OMS-5 BURN. READ 0.4% AND 1.4% AFTER OMS-6. USE FUEL GAGE AND/OR BURN TIME FOR OX QUANTITY. T/S IN HMF AT KSC.	C. HUMPHRIES DR 11F004 CLOSURE IN PROCESS
8.	INTEGRATED RENDEZVOUS TARGET (IRT BALLOON) FAILED.	36:11:51	IRT DEPLOYED BUT STAVES DID NOT SEPARATE. BALLOON FABRIC APPEARED SEPARATED FROM CANNISTER. REMOVED JETTISON ASSY AND RETURNED TO JSC. IMPROPER CRIMP CONNECTION FAILED.	C. LE BLANC FIAR HEN 0039F CLOSURE IN PROCESS
9.	EMU 2 LIGHT PROTECTIVE LENS CRACKED.	35:19:49	CREW REPORT. LENS ON HELMET NOT AN ENVIRONMENTAL SEAL. NO IMPACT ON MISSION. R&R. FIAR ILC-H-0060F.	R. MARAK CLOSURE IN PROCESS
10.	KU-BAND RF POWER OUTPUT WENT TO ZERO.	36:21:38	TWT TURNED OFF BY FAULT SENSING LOGIC CIRCUITRY IN DEA. CYCLED POWER FROM "ON" TO "OFF" TO "ON" AND KU-BAND POWER RECOVERED WITH NOMINAL PERFORMANCE. FLY AS IS FOR STS-41C.	R. FENNER CAR 11F003 CLOSURE IN PROCESS
11.	GNC DOWNLIST DATA INCORRECT IN LOW DATA RATE.	35:06:08	6 MEASUREMENTS IN FORMATS 22 (ON-ORBIT) AND 23 (ENTRY) PLUS 8 IN FORMAT 32 (ON-ORBIT CHECKOUT) MAY BE INCORRECT IN LDR DOWNLIST. PCMMU TIMING AFFECTS LAST 8 BITS OF GNC DOWNLIST LDR FRAME. NO CONSTRAINTS FOR STS-41C. JSC EVALUATION.	H. HERNANDEZ P. DUFFIN N. HARDEE CLOSURE IN PROCESS
12.	RRCS R3A DRIVER OUTPUT DISCRETE FAILED.	38:11:49	JET DRIVER INDICATION FAILED DURING HOT FIRE TEST PRIOR TO FIRST EVA. FOUND RECESSED PIN. REPAIRED AND RETESTED CONNECTOR.	R. EGUSQUIZA CLOSED 03/07/84

TABLE III.- ORBITER AND GFE PROBLEM TRACKING LIST (Continued)

JSC OV-099 STS-41B PROBLEM TRACKING LIST — MARCH 13, 1984

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
13.	SUPPLY WATER DUMP VALVE FAILED TO OPEN.	39:08:48	VALVE OPENED ABOUT 40:06 G.M.T. BUT SUPPLY WATER DID NOT DUMP. SUSPECT FREEZING IN LINE. POST FLIGHT FOUND LINE BROKEN UPSTREAM OF VALVE AND INSULATION MISSING ON LOWER VALVE BODY OF BOTH SUPPLY AND WASTE DUMP VALVES. RTV MISSING AROUND BOTH NOZZLES. INSULATION & RTV REPLACED.	H. ROTTER DR 11F017 CLOSURE IN PROCESS
14.	FRCS F3D HEATER THERMOSTAT SET POINT SHIFTED.	37:10:00	CYCLED BETWEEN 64 AND 68 DEG F IN ABOUT 0.5 HOUR. SUSPECT BROKEN TEMP SENSOR WIRE. JET IS USABLE. NO MISSION IMPACT. FLY AS IS FOR STS-41C. CYCLED BETWEEN 68 AND 69 DEG F POSTFLIGHT.	D. BLEVINS CAR 11F013 CLOSED 03/07/84
15.	STORAGE DOOR MD23R DIFFICULT TO OPEN, WCS DOOR DID NOT LATCH AND ACCESS DOOR TO IMU FILTERS WAS HARD TO CLOSE.	35:21:17	CREW USED HAMMER TO FORCE OPEN AND TO CLOSE. REPOSITION MS 1 SEAT AND TREADMILL FOR ENTRY IF UNABLE TO CLOSE. WCS DOOR HAD 1/8 INCH GAP BETWEEN LATCH AND JAMB.	W. LANGDOC DR 11F012 CLOSURE IN PROCESS
16.	POWER DRIVE UNIT RUDDER SPEED BRAKE SYSTEM 3 SECONDARY SWITCHING VALVE INDICATION (V58X1001E) FAILED.	37:22:36 AND 39:02:30	NO EVIDENCE OF IMPROPER VALVE OPERATION. CIRC PUMP PRESS SYS 3 WAS OVER 200 PSI WITH SYS 1 & 2 ABOUT 50 PSI BUT SECONDARY INDICATION STAYED AT ONE. OPERATION NORMAL FOR ENTRY AND POSTFLIGHT.	W. MCMAHON CLOSURE IN PROCESS
17.	R RCS VERNIER JETS R5R & R5D FAILED OFF.	39:21:36:41 & 40:10:56:58	DRIVER POWER FOR R5 INTERMITTENT. USED PRIMARY JETS FOR SLEEP AND EVA-2. FAILURE IN DRIVER OUTPUT CIRCUIT OF CONTROL ASSEMBLY 2. R&R.	R. BURGHDUFF CAR 11F011 CLOSED 03/07/84
18.	RMS WRIST YAW JOINT FAILED IN PRIMARY AND END EFFECTOR THERMAL BLANKET DAMAGED.	40:09:23:33	HARD FAILURE OF COMM SCANNER INDICATED. ALL RMS SPAS OPERATIONS DELETED. WRENCH OR TOOL PUSHED INTO BLANKET AT 42:00:46 G.M.T. PROBLEM DID NOT REPEAT, REPLACED MOTOR MODULE. R&R ARM.	J. PECK FIAR RMS1317F
19.	EMU TV FAILED.	40:10:56	NO GREEN LIGHT FOR EVA-2. USED VERBAL MARKS FOR MMU THRUSTER FIRINGS DURING MMU EVALUATION TEST AND CREW COMMENTS FOR FREON TRANSFER EXPERIMENT. R&R. ZERO VOLTS ON ONE OF 8 BATTERY CELLS.	B. EMBREY FIAR EE0576F CLOSURE IN PROCESS

TABLE III.- ORBITER AND GFE PROBLEM TRACKING LIST (Continued)

JSC OV-099 STS-41B PROBLEM TRACKING LIST — MARCH 13, 1984

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
20.	RMS ELBOW TV FAILED.	40:14:07	SOMETHING LOOSE IN LENS. LOST FOCUS. USED CAMERAS A AND C FOR MMU EVALUATION TEST. R&R.	B. EMBREY FIAR RCATVA 2549F CLOSURE IN PROCESS
21.	EMU SUBLIMATOR "P HIGH" MESSAGES.	38:17:21 & 40:11:38	MESSAGE ON EMU-2 FOR EVA-1 AND 2 MESSAGES EACH ON BOTH EMU'S FOR EVA-2. STANDARD MALFUNCTION PROCEDURES CORRECTED PRESSURE EACH TIME. R&R. FOUND CONTAMINATION IN BOTH REGULATORS.	M. LAWSON F-EMU-1364B-01 AND 02 CLOSURE IN PROCESS
22.	EVA ANCILLARY EQUIPMENT:			CLOSURE IN PROCESS
A	FOOT RESTRAINTS DIFFICULT TO INGRESS.	EVA-1 & 2	EV-2 BOOT TOE TOO BIG TO EASILY FIT UNDER TOE BAR. EXCESSIVE TOE PADDING ON SMALL SIZE BOOTS.	H. STUTESMAN F-EMU-1044B01
B	SLIDE WIRE LINKAGE PIP PIN CAME OUT.	EVA-2	EV-1 REPLACED PIP PIN. R&R.	F. MCALISTER CAR 11F008
C	FOOT RESTRAINT FOR SESA CAME FREE.	EVA-2	EV-1 RECOVERED & REPLACED FOOT RESTRAINT. REINSTALLED SAFETY TETHER.	M. RODRIGUEZ
D	SECONDARY TRUNION PAD ATTACHMENT DEVICE CONTROL ROD JAMMED AND PRIMARY BACKED OFF DURING RATCHETING.	38:16:30 40:12:10	WRENCH USED TO ROTATE ROD. EV-1 BACKED OFF, REARMED PTPAD AND CONTINUED WITH NO PROBLEM.	H. STUTESMAN
E	STARBOARD MMU RIGHT HAND LAP BELT TO EMU DIFFICULT TO INSTALL.	EVA-2	CREW REPORT. RH LAP BELT HARD TO ENGAGE ON STB MMU. SUSPECT TOLERANCE BUILDUP. REDESIGNED BELT.	E. WHITSETT
23.	VIDEO TAPE RECORDER CREASING TAPES.	40:19:56	CREW REPORT. USED 16MM CAMERA FOR RECORD. NO PROBLEM USING UNRECORDED TAPE. PROBABLE LOOSE TAPE ON TWO PRE-RECORDED CASSETTES. R&R.	C. HYMAN FIAR EE0578F CLOSED 03/07/84

TABLE III.- ORBITER AND GFE PROBLEM TRACKING LIST (Continued)

JSC OV-099 STS-41B PROBLEM TRACKING LIST — MARCH 13, 1984

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
24.	GPC 1 BENIGN REGISTER ALTERATION LOGGED WRONG CRT 2 I/O ERRORS.	35:22:30	GPC 1 CONSISTENTLY DETECTED AN MSC TIMEOUT ON BCE 7 WHILE GPC 2 DETECTED AN INITIAL TIMEOUT ON THE SAME BUS. TEST POSTLANDING CONFIRMED SINGLE BIT "PICKED" IN RAM USED FOR IOP REGISTER. R&R.	P. SOLLOCK CAR 11F005 CLOSED 03/07/84
25.	S-BAND UPPER AND LOWER RIGHT FORWARD ANTENNA ACQUISITION LATE WITH TDRSS.	38:23:00	OCCURRED SEVERAL TIMES WITH GOOD ANTENNA LOOK ANGLES. SUSPECT ANTENNA SWITCH CONTACTS CHARRED. SUSPECT GENERIC PROBLEM FROM STS-8 AND 9. GROUND TEST REPEATED FAILURE. R&R BOTH ANTENNAS.	O. SCHMIDT CAR 11F014 CLOSURE IN PROCESS
26.	APU 2 FUEL PUMP VALVE SYSTEM A HEATER FAILED.	PRELAUNCH	OPERATED ON SYSTEM B HEATER DURING THE MISSION. CYCLED OK FOR GROUND TEST. HEATER TURNED ON AT ABOUT 72 DEG F. RETEST AT VENDOR TO VERIFY LOWER SET POINT.	R. LANCE CAR 11F016 CLOSED 03/07/84
27.	TPS DAMAGE TO LEFT OMS POD AND NOSE AREA.	ASCENT AND ENTRY	POSTFLIGHT INSPECTION. LEFT OMS POD CORE SAMPLE BAD. PIECES OF 3 TILES MISSING. 2 SQ FT DELAMINATED. INNER FACE SHEET INTACT BUT PUSHED BACK 4 INCHES. SUSPECT ICE OFF WATER DUMP NOZZLE HIT POD. REPLACED WITH L OMS POD FROM OV-103. PROBABLE BIRD HIT ON TOP OF NOSE AFT OF RCC.	J. SMITH CLOSURE IN PROCESS
28.	TELEMETRY FORMAT LOAD 161 HDR PROCESSING ERROR NOT DETECTED BY SOFTWARE.	41:09:54	SUCCESSFUL LOAD MUST PASS ECHO CHECK. PCMMU NOT IN FIXED FORMAT REQUIRED FOR TFL.	P. SOLLOCK CLOSURE IN PROCESS
29.	RIGHT OUTBOARD BRAKES DAMAGED.	LANDING	POSTFLIGHT INSPECTION. BROKEN RETAINER WASHERS. ROTOR CARBON EDGES CHIPPED AND DRIVE CLIPS PEENED. REMOVED AND REPLACED BRAKES.	C. CAMPBELL CAR 11F006 CLOSURE IN PROCESS
30.	SSME 3 ASCENT THRUST VECTOR CONTROL YAW CHANNEL 4 BYPASSED.	LANDING	POSTFLIGHT DATA ANALYSIS. COULD NOT REPEAT PROBLEM POSTFLIGHT. SUSPECT ACCUMULATION OF SILT IN SERVO ACTUATOR SYSTEM.	J. VERNON CLOSURE IN PROCESS

TABLE III.- ORBITER AND GFE PROBLEM TRACKING LIST (Concluded)

JSC OV-099 STS-41B PROBLEM TRACKING LIST — MARCH 13, 1984

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
31.	SSME 3 HELIUM PANEL A ISOLATION CHECK VALVE LEAKED.	BEFORE ENTRY	AFTER SSME HYDRAULIC REPRESS BY SYS B AT EI-13, SYS A PRESSURE INCREASED 600 PSIA IN 40 MINUTES. POSTFLIGHT LEAKAGE ACCEPTABLE FOR FLIGHT.	P. COTA CAR 11F019 CLOSURE IN PROCESS
32.	MLG ALL 4 TIRES HAD A FLAT SPOT.	LANDING	HIGH SPIN UP FRICTION ON GROOVED KSC RUNWAY. ALL 4 MLG TIRES AND 1 OF 2 NLG TIRES REMOVED FROM SERVICE.	C. CAMPBELL DR 11F015 CLOSURE IN PROCESS
33.	KU-BAND RENDEZVOUS RADAR DID NOT LOCK ON DURING FIRST EVA.	EVA-1	FAILED SELF TEST BEFORE EVA-1 AND ONE TIME POST-FLIGHT. LOCKED ON AS EXPECTED DURING EVA-2. DEPLOYED ASSEMBLY RETURNED TO VENDOR FOR CAPACITOR MOD. RETURNED TO KSC ON 3/9.	R. FENNER DR 1 F021 CLOSURE IN PROCESS
34.	PAYLOAD BAY DOOR RIGHT HAND BULKHEAD AFT LATCH LOST ONE PHASE ON MOTOR 2 DURING OPENING AND CLOSING.	ON ORBIT	POSTFLIGHT DATA EVALUATION. CONFIRMED DURING GROUND DOOR OPERATIONS. RECESSED CONNECTOR PIN REPAIRED AND RETESTED.	R. BALCIUNAS CLOSURE IN PROCESS

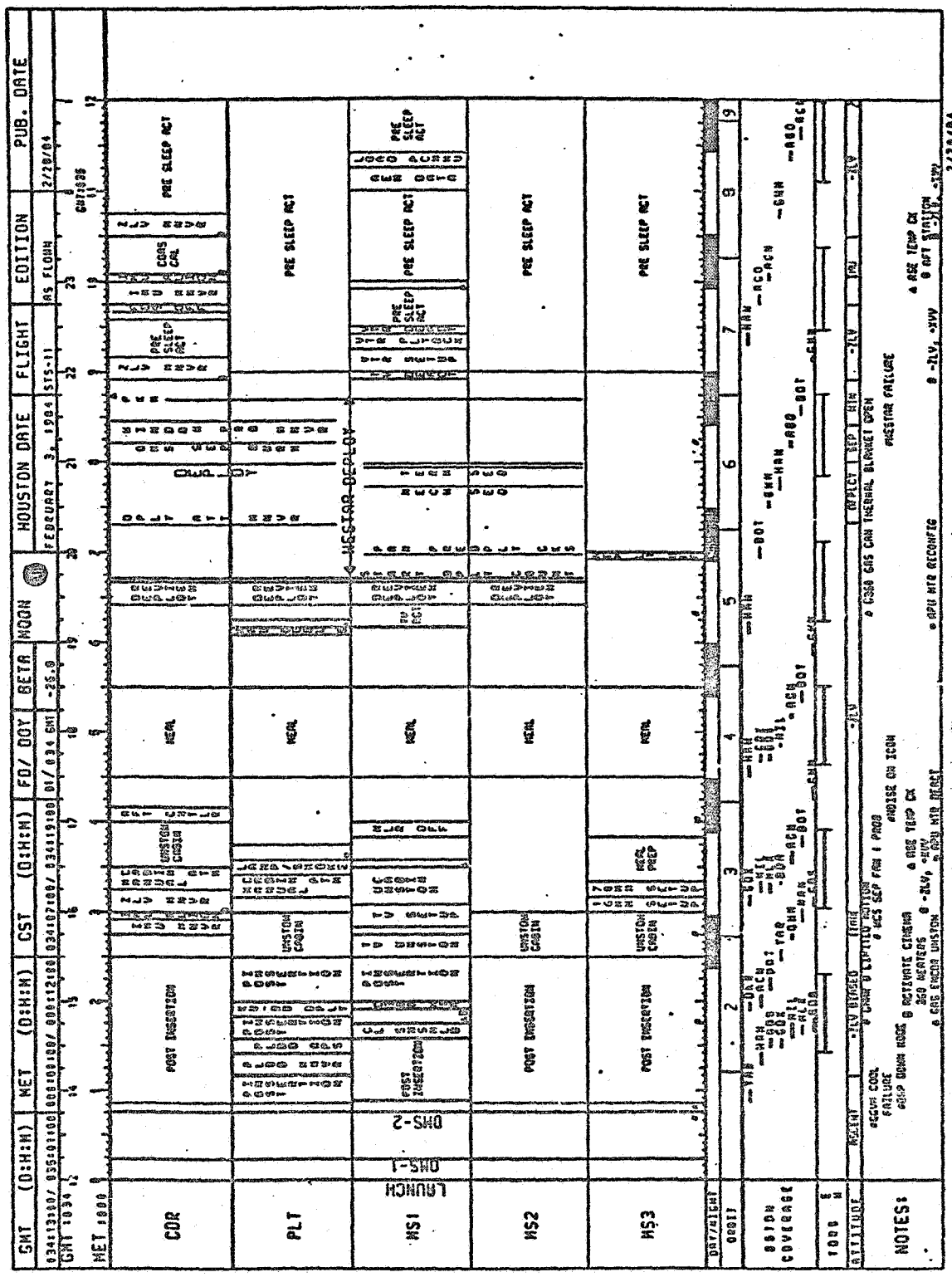
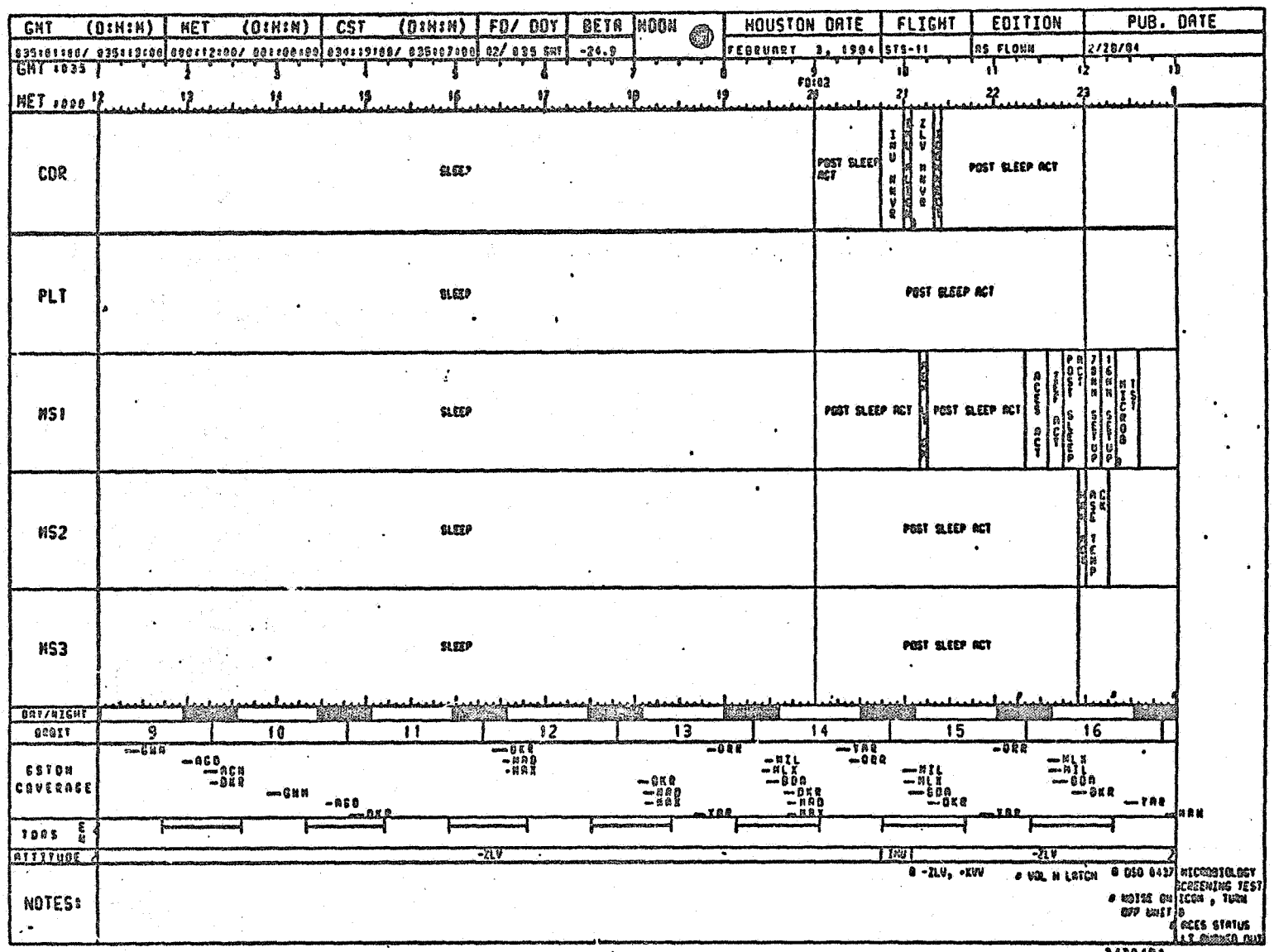


Figure 1.- As-flown crew activity plan.



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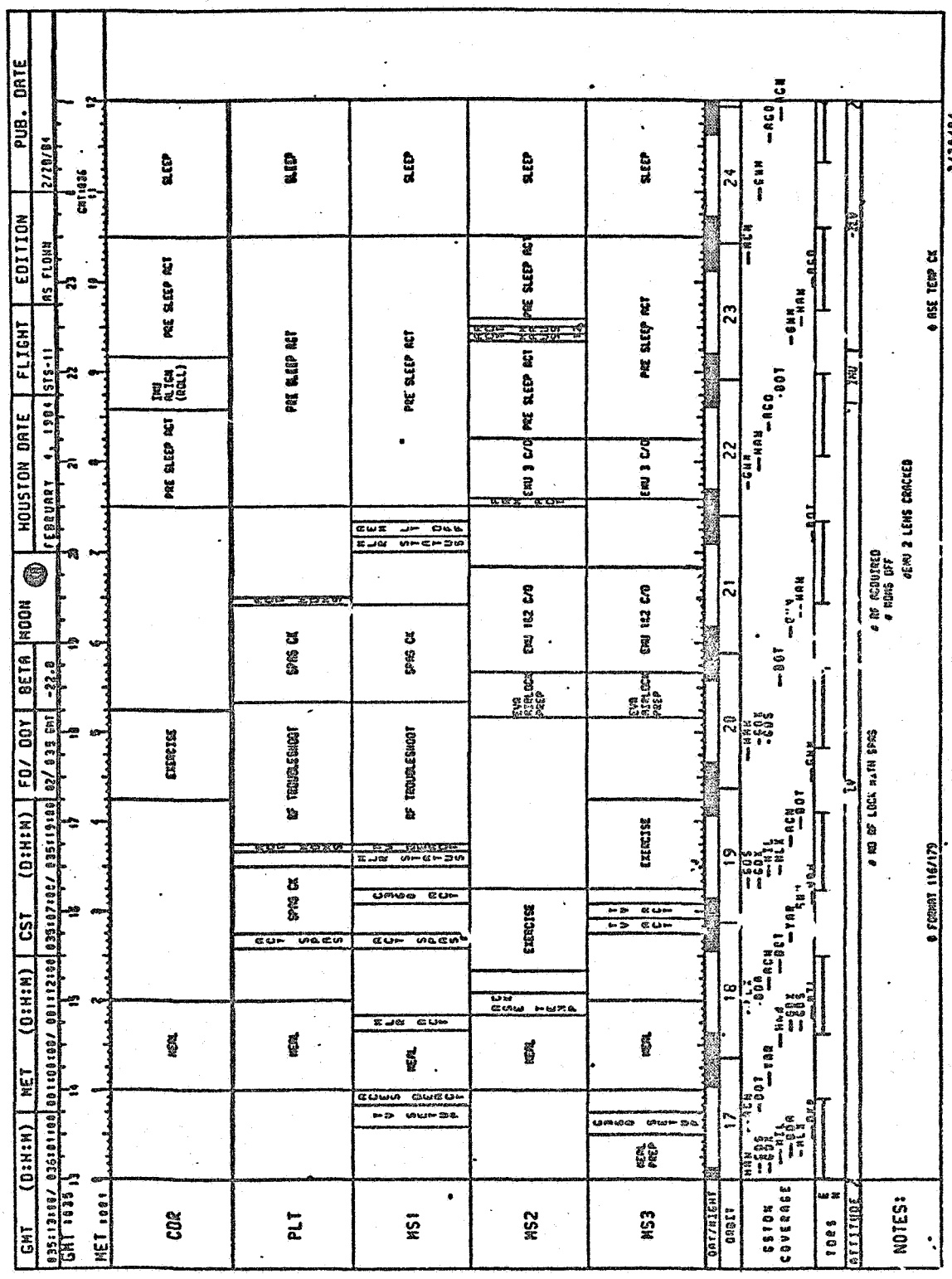

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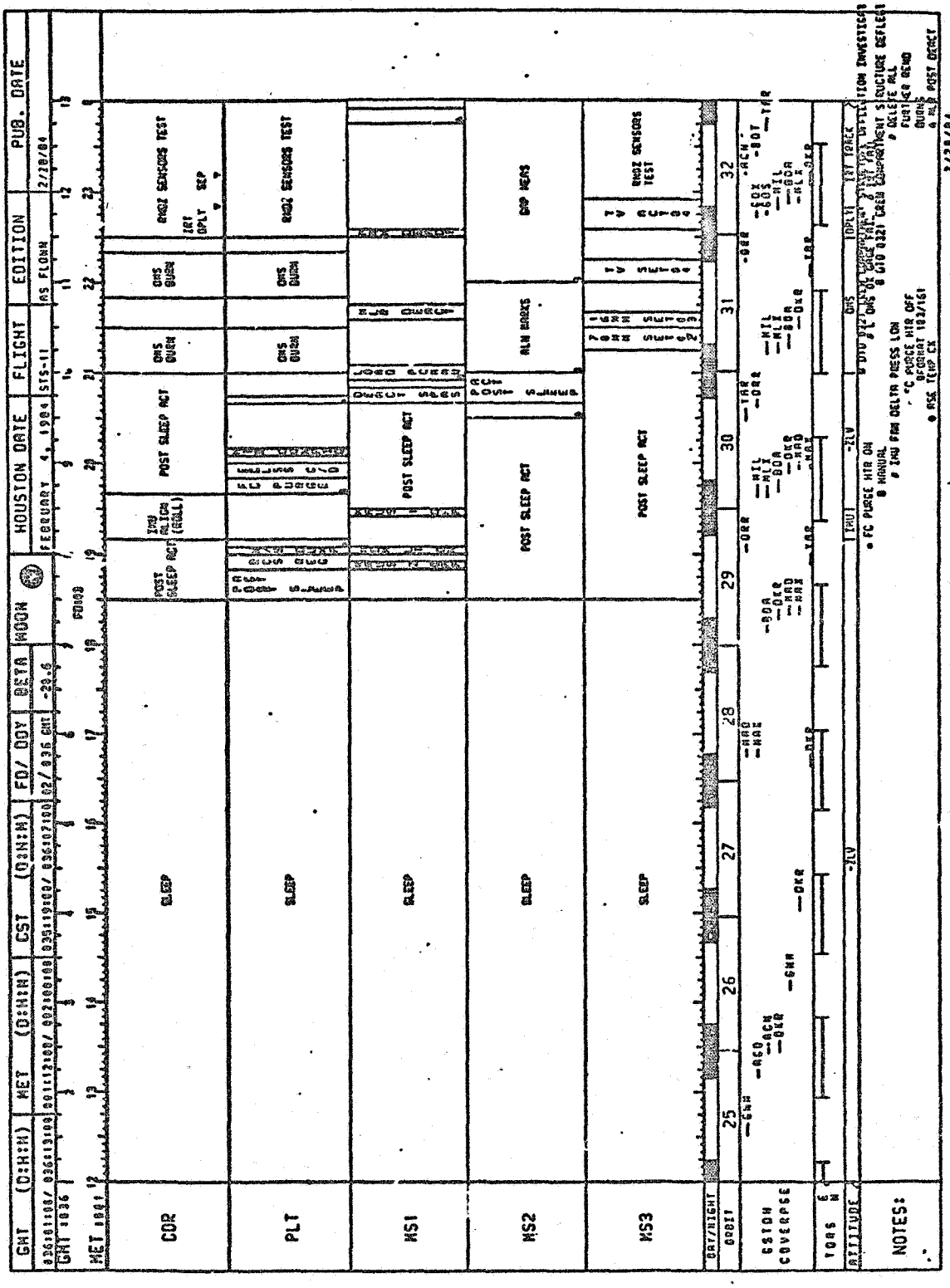

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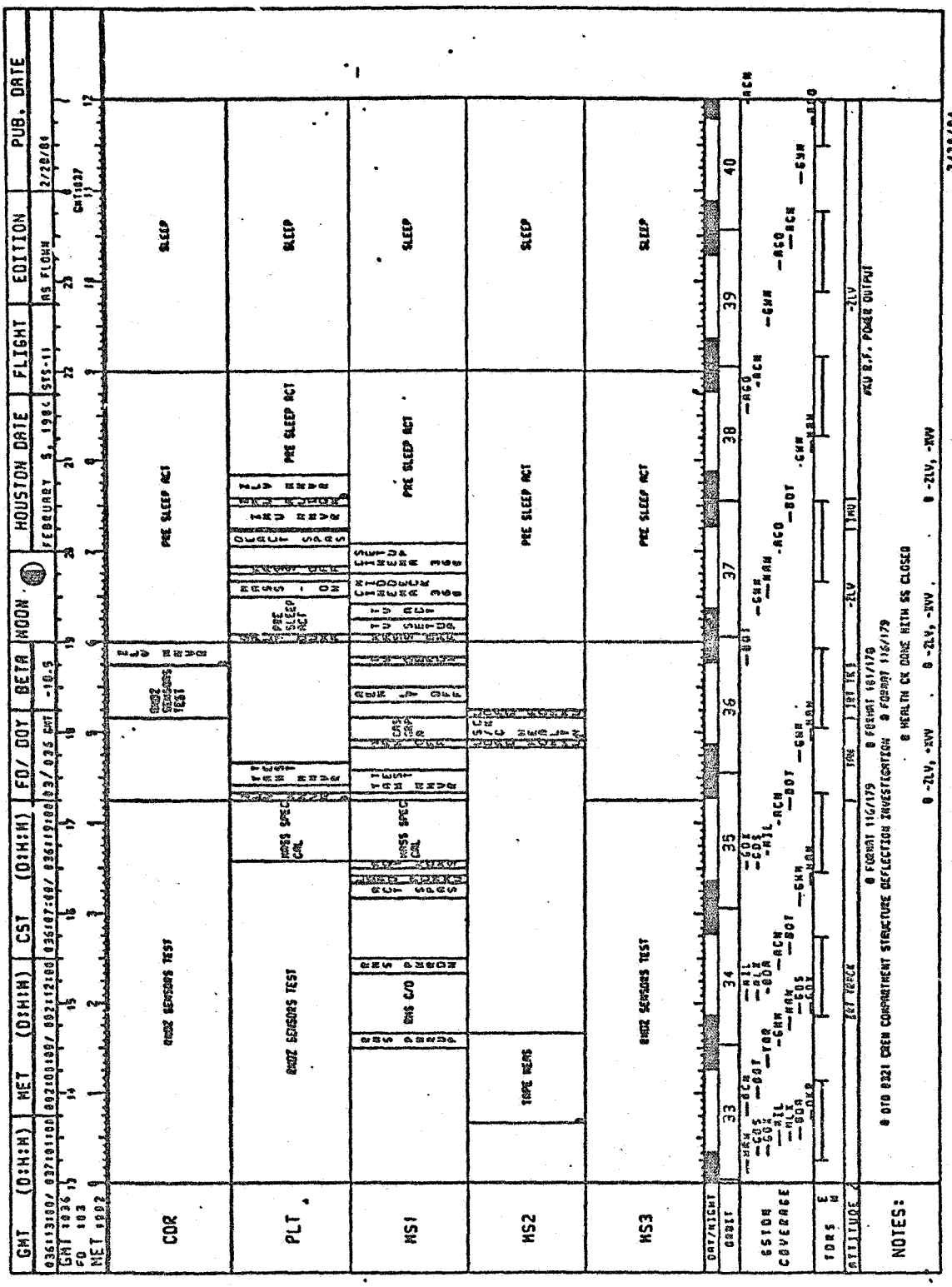

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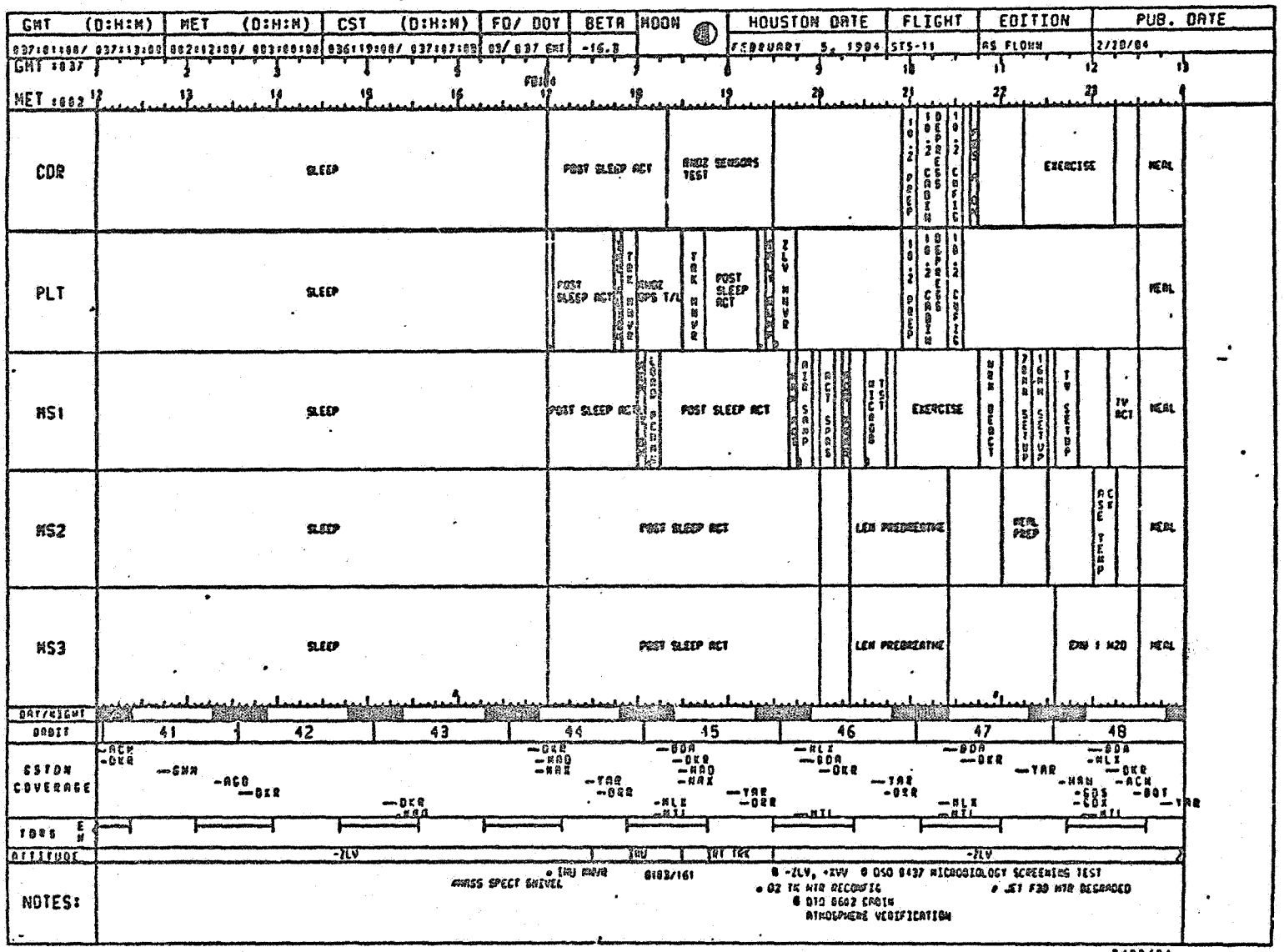

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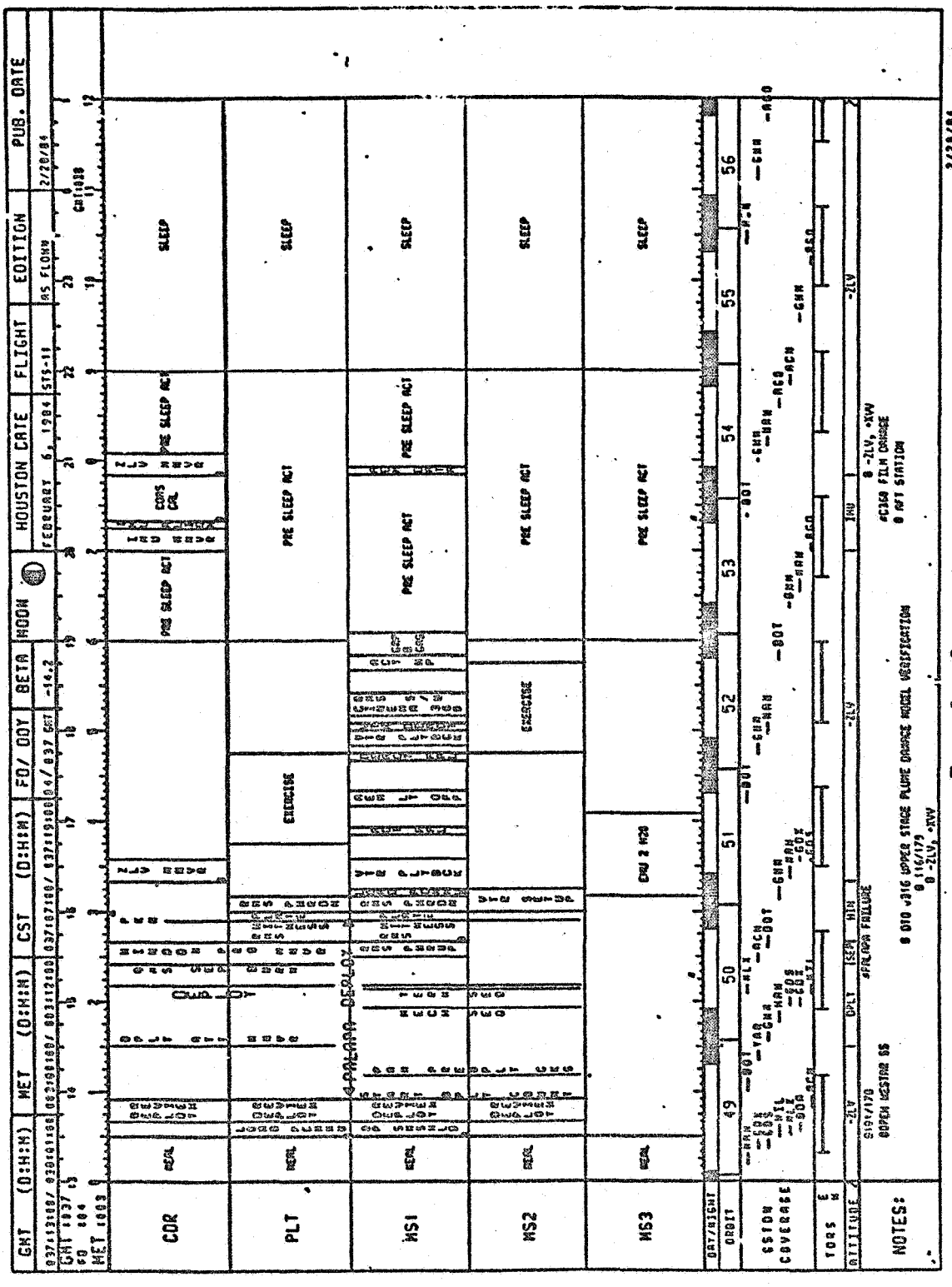

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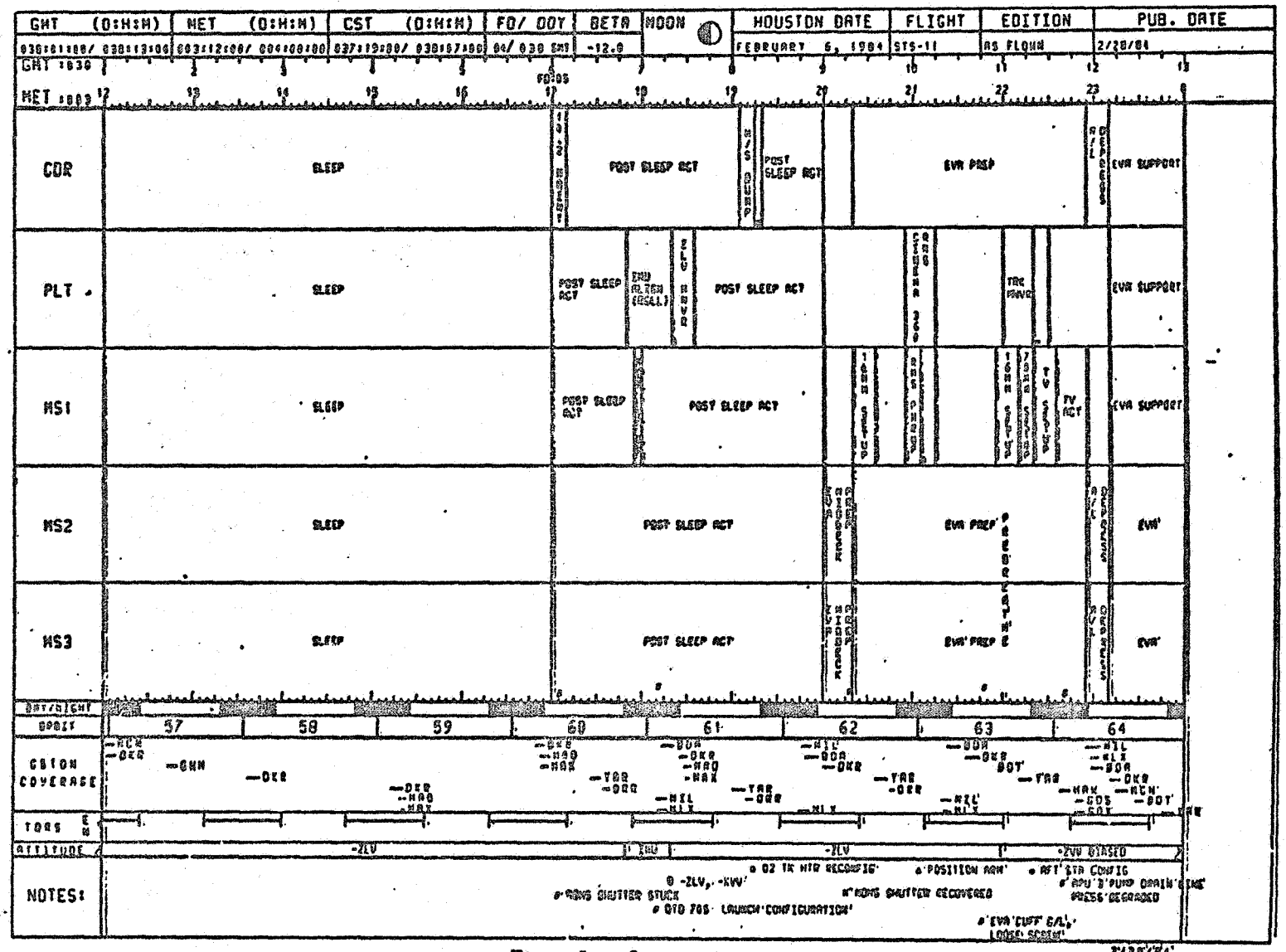

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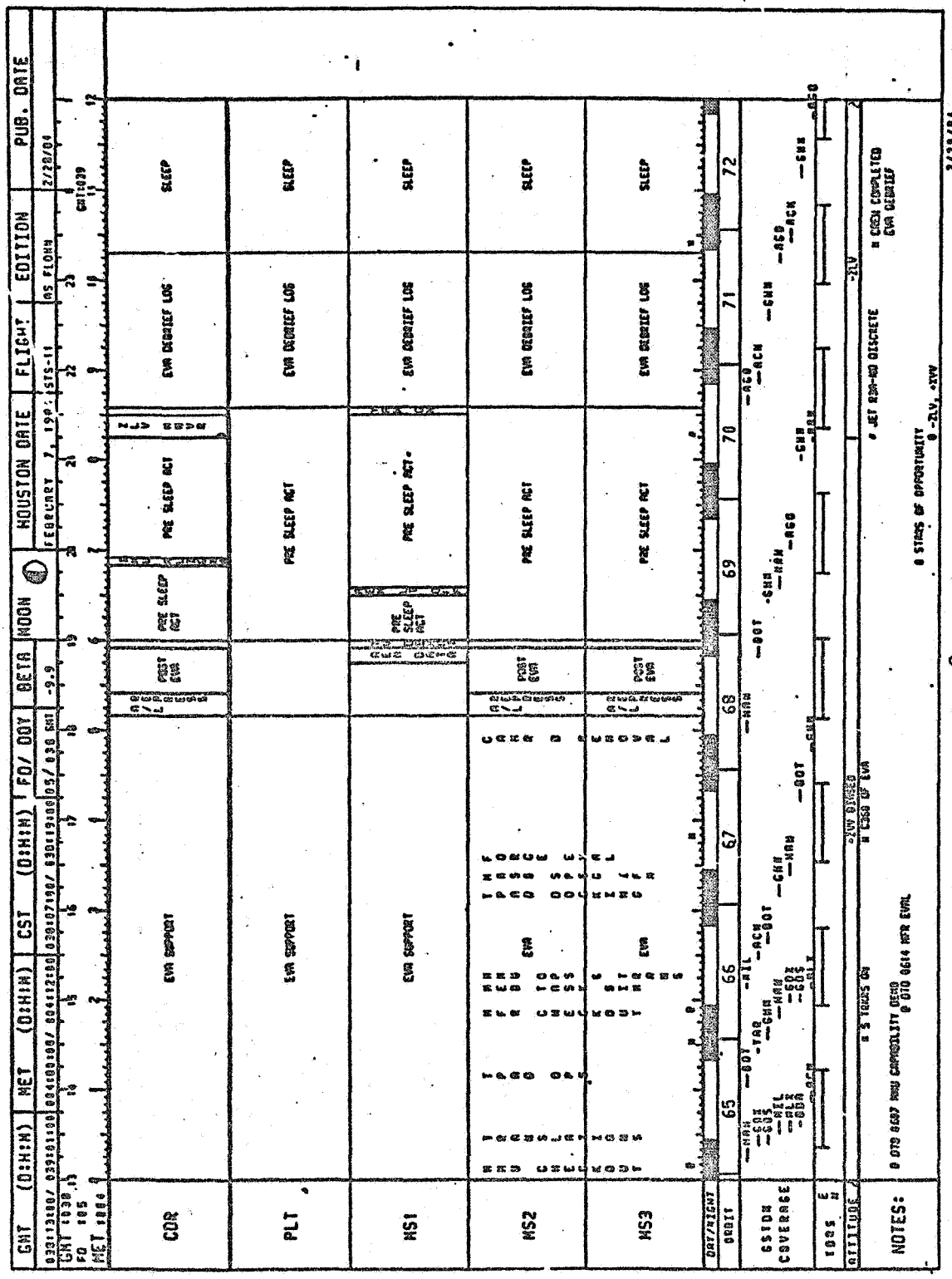

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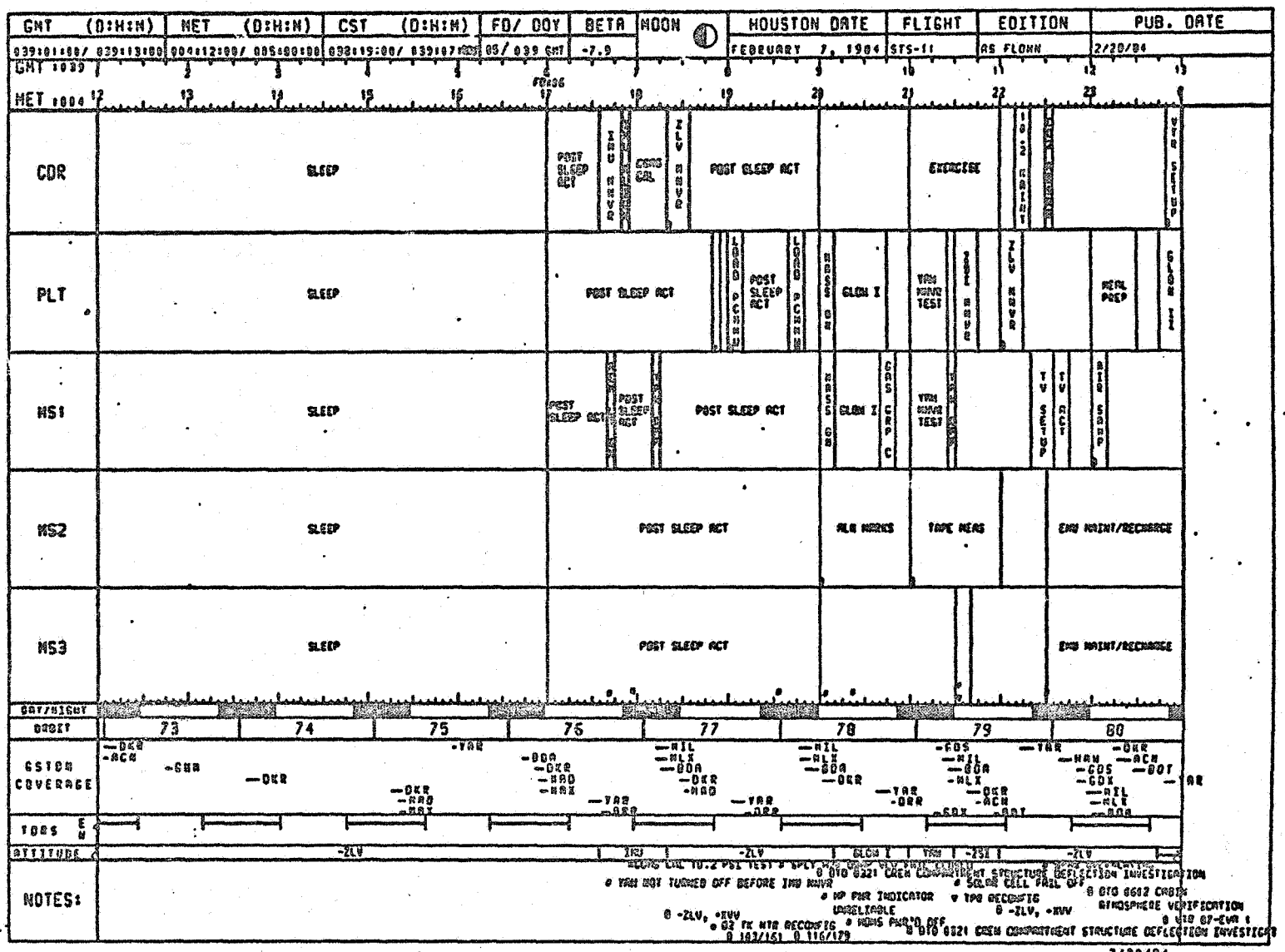

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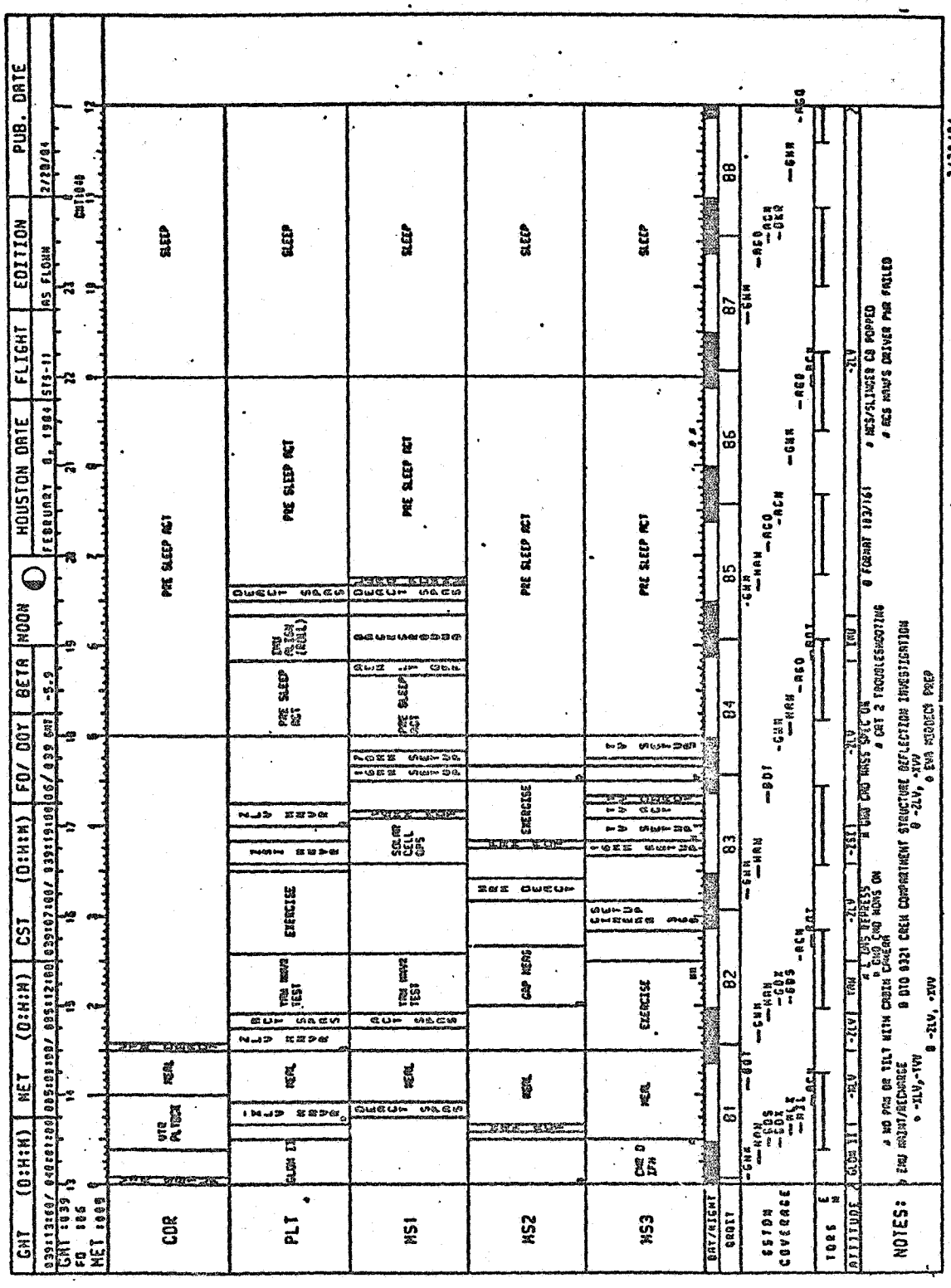

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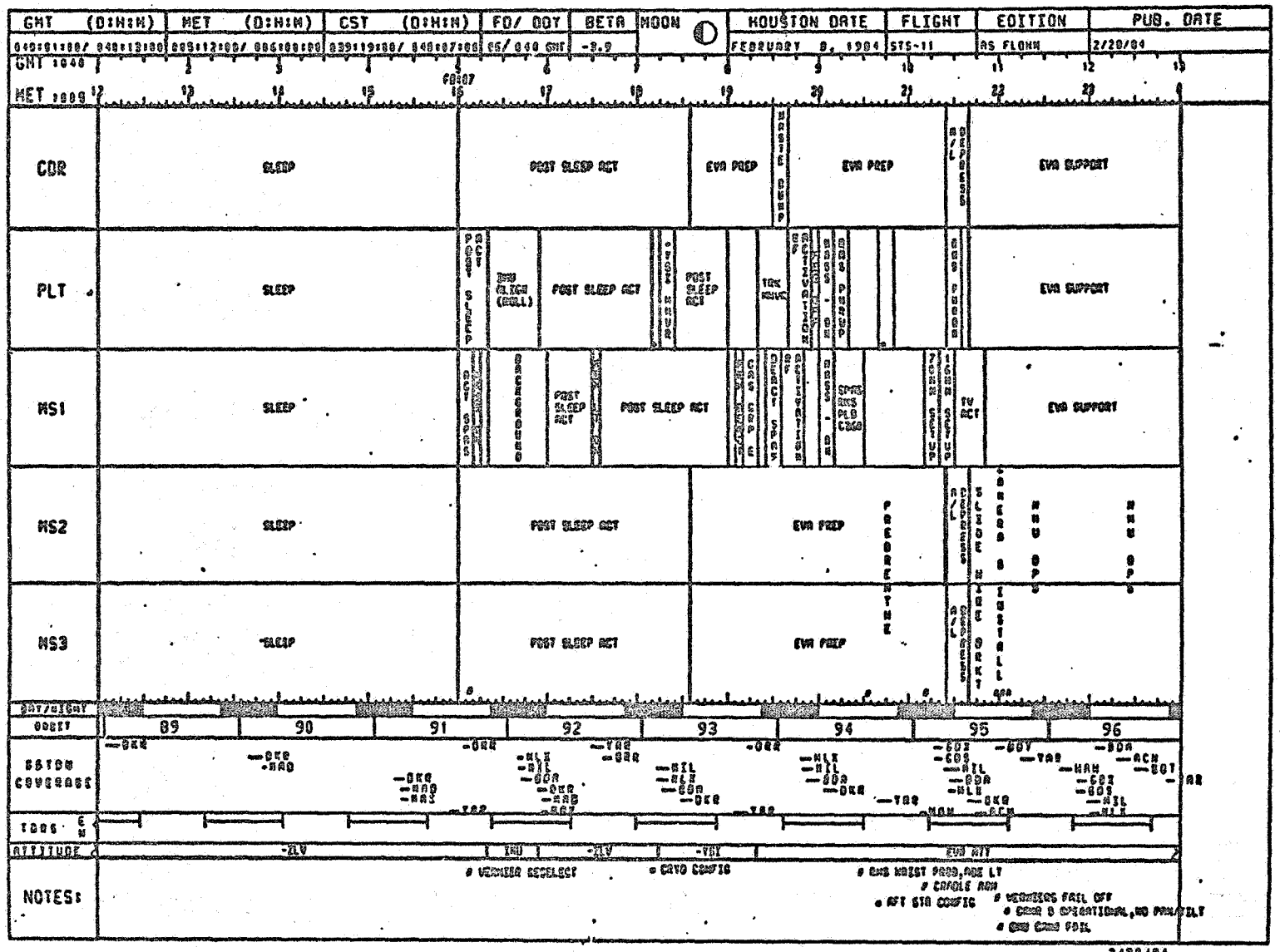

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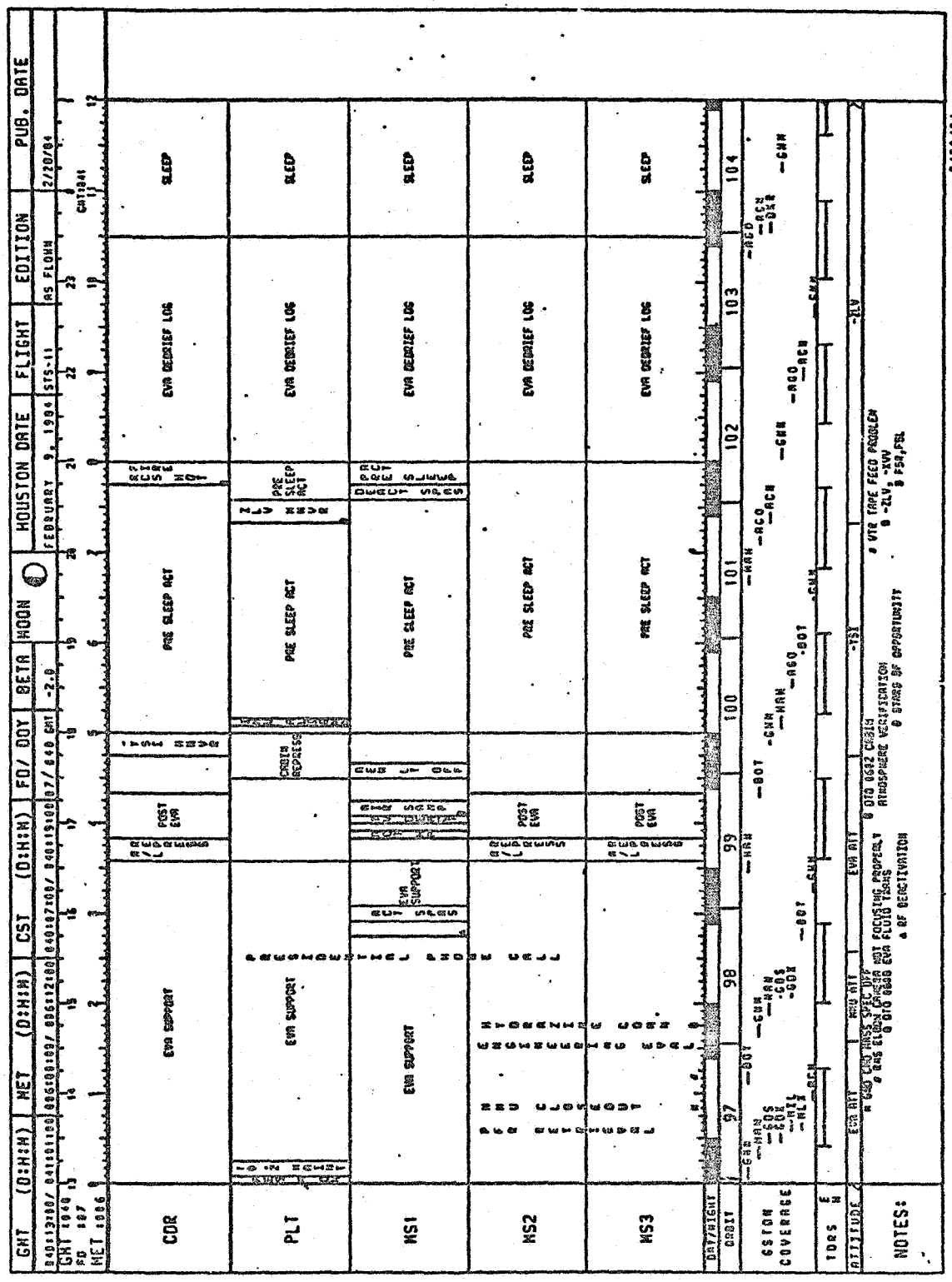

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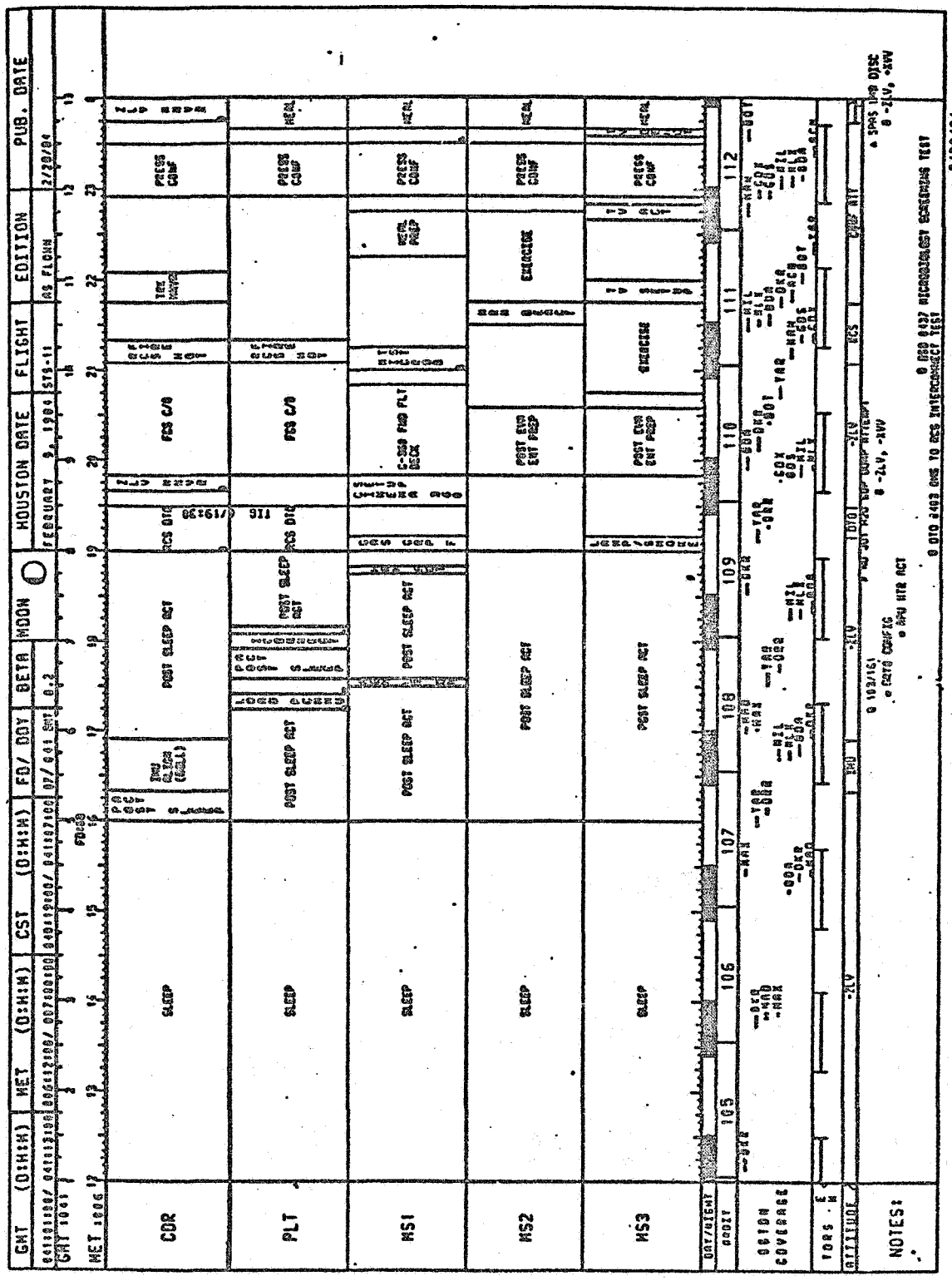

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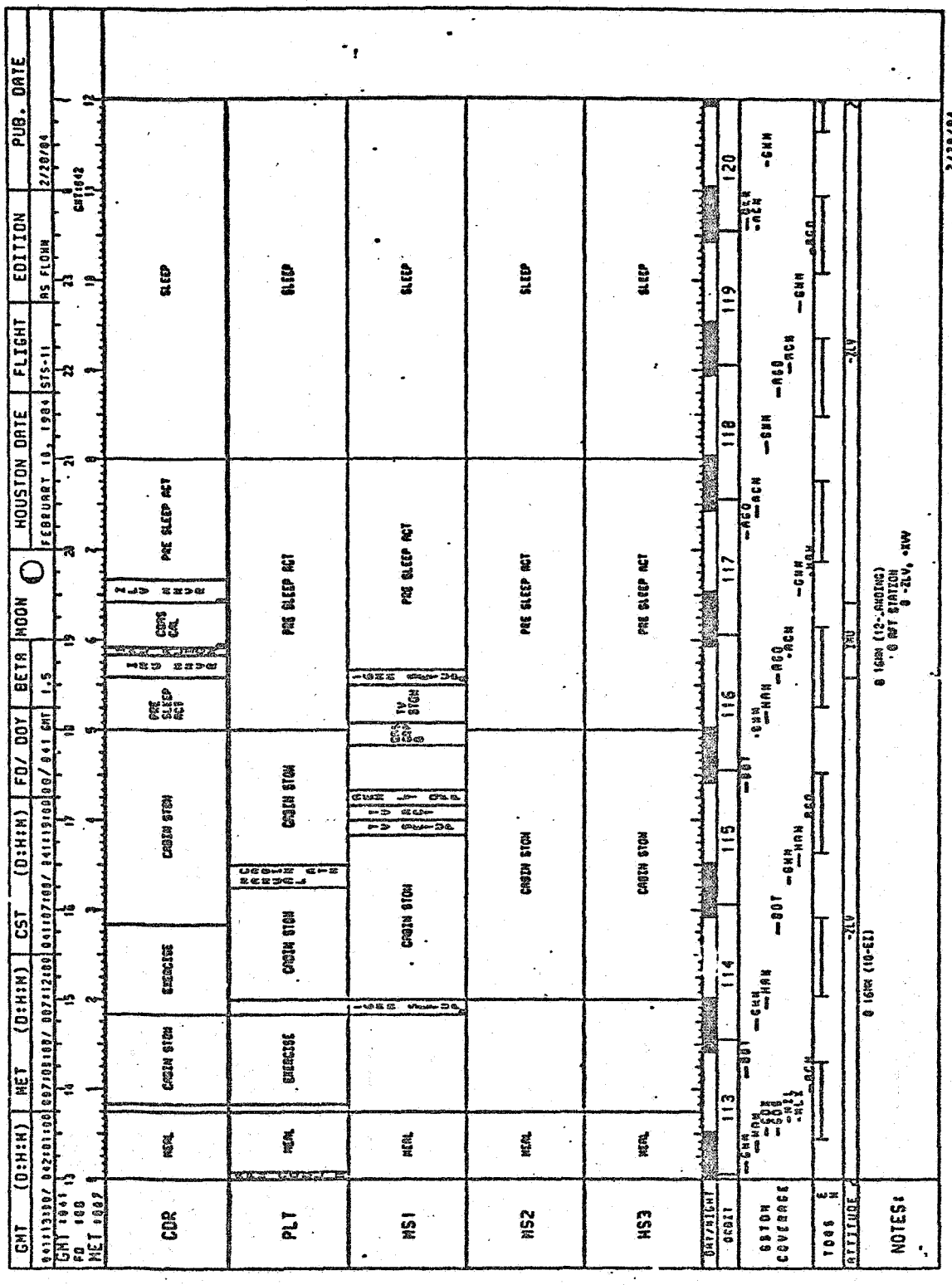

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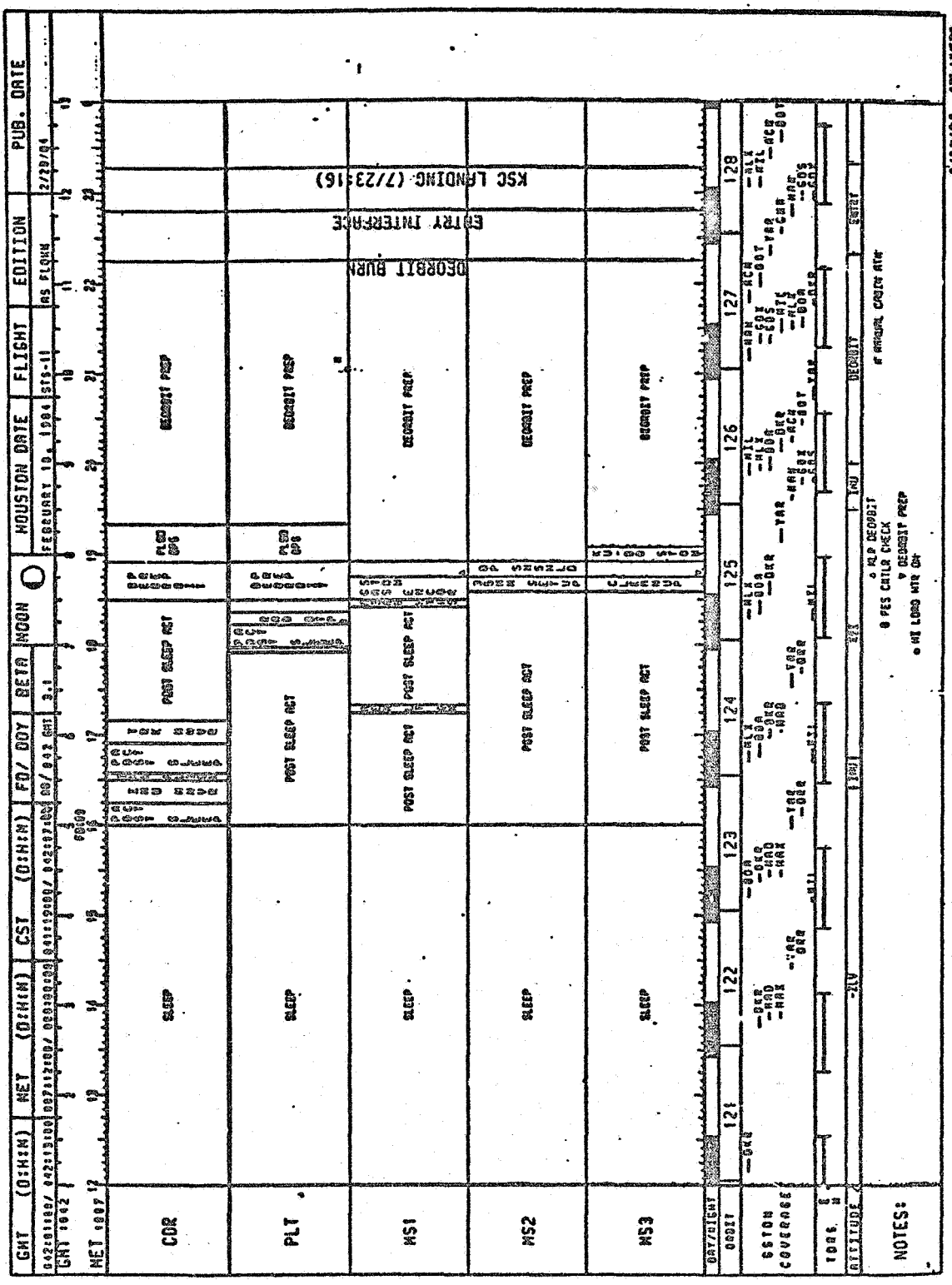

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