ALSEP Daily Science Reports

1969-1970

ALSEP Daily Science Reports 1969 – 1970
Table of Contents

ALSEP DAILY SCIENCE REPORT
November 20, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP was deployed on the lunar surface by the crew of Apollo 12 on November 19, 1969. The transmitter was turned on by ground command at 8:21 A.M., CST, approximately 69 minutes after fueling of the Radioisotope Thermoelectric Generator. Initial conditions of the central station were normal. Power output of the RTG was 56.74 watts at this time. A reserve power reading of 29.13 watts indicates that the basic power consumption was 27.61 watts, normal for ALSEP start-up. Downlink signal strength of -139 dbm and the execution of uplink commands verified normal communications.

Experiments were turned on at the following times: Passive Seismic Experiment, 8:24 A.M.; Lunar Surface Magnetometer, 8:39 A.M.; Dust Detector, 9:04 A.M.; Solar Wind Spectrometer, 12:40 P.M.; and Suprathermal Ion Detector, 1:18 P.M. The Cold Cathode Ion Gauge seal was removed at 2:04 P.M. All initial conditions were normal.

The PSE was uncaged by command, followed by gain change, leveling, and calibration operations. Range and offset adjustments of the LSM were commanded and one flip/calibration was performed. Approximately 110 commands have been processed.

The PSE recorded astronaut operations including core tube activities, footsteps, and discarding of Portable Life Support Systems. Magnetometer indications are in the range of 20 gamma. On the Dust Detector, the readings of top and west solar cells were initially off-scale low, as expected, but after 9:05 A.M. all cells were providing readings due to a higher sun angle.

A status change in PSE calibration at 7:02 P.M. indicated a 12-hour timer pulse. This occurred within two minutes of the predicted time. The second 12-hour pulse was observed at approximately 7:02 A.M. on November 20.

During the second EVA, the commander inspected the Cold Cathode Ion Gauge, verifying that the seal was removed and the aperture was pointed to the sky at a 60° angle, and down-sun.

Subsequent to the initial turn-on, the average thermal plate temperature decreased for approximately four hours (from 51.6°F to 45°F), then began a gradual rise. This initial transient dip was in agreement with predictions. The average thermal plate temperature at 7:00 A.M. is 60.0°F and the rate of increase is 0.7°F per hour. This is normal for the rising sun condition.

Downlink signal strength has remained steady at -138 dbm. Other 7:00 A.M. status is as follows:

Sun Angle	20.3°
Input Power	73.04 watts
Reserve Power	35.95 watts
Heaters & Power Dumps	Off
Experiments Status	All On

ALSEP DAILY SCIENCE REPORT
November 21, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function at this time, 47 hours after being placed on the surface by the crew of Apollo 12. The package measured the effects of Lunar Module ascent at 8:25 A.M. CST on 20 November and to the subsequent impact of Lunar Module at 4:17 P.M.

Central station performance is normal with RTG power output constant at 73.3 watts. Downlink signal strength remains constant at -139 dbm. A total of 153 commands were transmitted to the central station from Mission Control for various experiment adjustments during the past 24 hours. The average thermal plate temperature is increasing at a rate of 0.7°F per hour as expected for the present sun angle. At 7:00 A.M. this temperature read 76.2°F. A status change in PSE calibration at 7:02 P.M. on 20 November indicated the arrival of the third 12-hour pulse from the ALSEP timer. This was exactly on schedule. The fourth pulse arrived at 6:59 A.M., 21 November.

The PSE showed significant response to the LM ascent. After impact of the LM, a sustained effect was observed for 55 minutes. The impact point was 39 nautical miles from ALSEP. The PSE also detected the removal of dust covers of the Solar Wind Spectrometer. Other than these artificial disturbances, no appreciable signals were detected by the seismometer during this period; however, response to leveling and calibration operations verifies the functional performance of the instrument. Leveling of the PSE is being performed at approximately 4-hour intervals as the sensor temperature continues to rise toward thermal equilibrium. At 3:37 A.M., this temperature came on-scale for the first time, from the low end, reading 108°F. The equilibrium value, controlled by heater regulation, is approximately 125°F.

The Magnetometer performed its first flip/cal operation, by command, at 5:17 A.M. on 20 November (three hours before LM ascent). The magnetic signature of LM ascent consisted of four parts: (1) a period of rapidly varying flux starting at lift-off and continuing for one minute, (2) a period of slow flux variation for four minutes, (3) a quiet period for one to two minutes, and (4) a three-minute period of varying flux. The local field on the moon is time-varying when the moon is in the hot plasma transition region. The Magnetometer detected that the moon had passed into the earth's magnetic tail at approximately 9:00 P.M. on 20 November. Temperatures of the LSM have reached nominal equilibrium values. The flip/cal scheduled after LM ascent was performed at 6:33 A.M. on 21 November.

The dust covers of the Solar Wind Spectrometer were removed by command at 9:25 A.M. Collection of scientific data continues, with no unexpected results. Instrument temperatures are rising gradually, a normal trend for the present sun angle.

The Suprathermal Ion Detector showed an increase in count rate associated with LM ascent and a reading which may be related to LM impact. High voltage power supplies are experiencing shorting problems which could be arcing and is expected to clear up after thorough outgassing of the instrument. The temperature is rising slowly but in a normal manner. Readings of background counts in the detectors indicate that the internal pressure is increasing. This is probably due to more rapid outgassing as the temperature increases. Spectra have been obtained but these are probably contaminated by the outgassed elements from the instrument. It may take a full lunar cycle before this contamination becomes negligible.

The Cold Cathode Ion Gauge performed well when first activated but its high voltage power supply turned itself off around 5:00 A.M. on 20 November. This shut-off is probably due to arcing. The instrument can be reactivated but turns itself off after a few seconds. Since outgassing may be the cause of arcing, it is planned to defer further operation of the gauge until lunar noon when residual gasses are expected to have been baked out.

Output of the Dust Detector is following the change in sun angle as expected. The data indicate that the detector, and the central station sunshield may be tilted 5° toward the east. A slight change in output at the time of LM ascent could be interpreted as an increase tilt to 5.7° east. The effect is opposite to that of dust accretion. This tilt indication can be established only after the sun passes through lunar noon.

Status at 7:00 A.M. is as follows:

Sun Angle	29.4°
Input Power	73.59 watts
Reserve Power	35.41 watts
Heater & Power Dump Resistors	Off
Experiments Status	All On
Thermal Plate (Average)	76.2°F
PSE Sensor	111°F
LSM Sensors (Average)	28.3°C
Solar Wind Sensor Assy	33°C
SIDE (Average)	49.8°C
CCIG	324°K

ALSEP DAILY SCIENCE REPORT

November 22, 1969

Apollo Lunar Surface Experiments Package Status Report - 0800 CST

ALSEP continues to operate after 71 hours on the lunar surface. The central station shows normal performance. Some minor problems in the experiments are being investigated but scientific data is being collected, including the effects of passing through the earth's magnetospheric tail.

Central station operation is in agreement with predictions. The RTG output continues steady at 73.59 watts. The hot frame temperature went off scale high, exceeding 1149°F, at 1:00 AM on 21 November. Estimates of the hot frame temperature, from power output and cold frame temperature, indicate that the temperature is only slightly above 1150°F and should not cause any further problem. Furthermore, the temperature was almost constant for 24 hours (between 1146 and 1149°F) before going off scale. Downlink signal strength is steady at -139 dbm, plus or minus one dbm. During the past 24 hours, a total of 65 commands were transmitted to ALSEP from Mission Control for adjusting experiments. Three of these did not show Command Verification in telemetry Word 46, but were verified by functional changes in the experiments. Two of these "spacecraft rejects" were observed previously (20 November). The absence of Command Verification is being looked into, but it should not be a problem for operations. The average thermal plate temperature is increasing at a rate of 0.4°F per hour and reached 86.1°F at 7:00 AM. This is slightly below the nominal prediction, but within the predicted range. Calibration status of the PSE changed at 7:01 PM on 21 November, signalling the arrival of the fifth 12-hour timer pulse. The sixth pulse arrived at 6:57 AM on 22 November.

The PSE is showing very little data that can be recognized as natural seismic activity or meteorite impact. Sensors on the X and Y axes are operating normally but the long period Z (vertical) sensor appears to have an instability causing sudden shifts at regular intervals. The short period Z sensor shows very weak response indicating the possibility of a defective amplifier. Both of these conditions have existed for some time and investigations are under way.

The LSM continues to measure the effects of passing through the earth's magnetospheric tail. Between 1:00 AM and 6:00 AM on 22 November, significant changes in flux were detected which may be associated with the neutral sheet in the earth's magnetospheric tail. Additional measurements over the next few days will help to confirm the conditions in the neutral sheet. Around 1:00 AM on 22 November, a problem was encountered in one of the three filters of the LSM. This digital filter was bypassed by command and troubleshooting will be conducted at some later time. The next flip/cal operation is planned to be performed on 22 November.

The Solar Wind Spectrometer measured an increase in activity at the same time that the LSM detected flux changes. Analysis of the measurements is incomplete at this time.

The Suprathermal Ion Detector and Cold Cathode Ion Gauge are turned on, but their internal high voltage circuits have been commanded off because of an apparent arcing problem. Normal operation is being deferred until the residual gasses are thoroughly baked out (27 November). The power supplies were turned on for a brief period at 10:00 PM on 20 November to verify that they are operable.

Comparison of Dust Detector data with calibration data (for the top and East cells) shows a slight disagreement. The possibility of this being explained by a tilt of the detector cannot be verified until after lunar noon.

Status at 7:00 AM is as follows:

	Sun Angle	38.5^{o}
	Input Power	73.59 watts
	Reserve Power	35.14 watts
	Heaters & Power Dump Resistors	OFF
*	Experiment Status	All ON
	Thermal Plate (average)	86.1^{o}F
**	PSE Sensor	126.13^{o}F
	LSM Sensors (average)	41.3^{o}C

7:00 AM Status (Continued)

Solar Wind Sensor Assembly	45.25°C
SIDE (average)	61.8°C
CCIG	339.4°K

* SIDE and CCIG are receiving operational power, but high voltage power supplies are off (by command)

**PSE temperature stabilized at 4:00 AM on 22 November.

ALSEP DAILY SCIENCE REPORT

November 23, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

Four days after being placed on the lunar surface by the crew of Apollo 12, ALSEP continues to collect scientific data and transmit it to earth.

In general, the equipment is performing at the predicted levels, or better. Minor problems with some experiments are discussed below. The moon is approaching the center of the earth's magnetospheric tail, corresponding to full moon, and will pass that milestone at 4:00 A.M. CST on 24 November. This region of the magnetospheric tail has scientific importance for several of the experiments.

Central Station performance is exceptionally stable. Downlink signal strength continues at -139 dbm. The RTG output has been 73.59 watts for the past 48 hours. The cold frame temperature has been between 464 and 466°F for 24 hours. Therefore, the RTG hot frame temperature which went off-scale (above 1149°F) on 21 November is not a cause for concern. During the past 24 hours, 74 commands were transmitted to ALSEP from Mission Control for experiment adjustments. Total commands transmitted to date is 457. During this reporting period, there was one more "space-craft reject" in which the functional response to a command transmission was observed but no verification was read out in ALSEP telemetry word 46. This makes a total of seven since initial activation of ALSEP. This does not appear to be a significant problem. The thermal plate temperature is now increasing at 0.1°F per hour, with a value of 90.7°F at 7:00 A.M. This is 20°F below the predicted value but is not indicative of a problem. The effects of an ALSEP 12-hour timer pulse was seen in the telemetry at 7:01 P.M. on 22 November. This seventh pulse, 84 hours after RTG plug-in, included the so-called 96-hour timer events (this is normal operation on ALSEP-1). The eighth pulse arrived at 6:57 A.M. on 23 November.

The Passive Seismic Experiment is detecting very little data that can be recognized as natural seismic disturbances or meteorite impacts. The short period Z sensor continues to operate below the expected sensitivity, as indicated by calibration pulses, and is believed to have a weak amplifier. No corrective action has been determined. The filter on the long period sensors has been commanded out of the circuit to correct an instability which was perturbing the Z-axis (vertical) long period sensor. Without the filter, tidal output is not affected but long period seismic data is attenuated. The temperature of the PSE sensor assembly has been stabilized around 126°F for the past 30 hours. This is reflected in a reduced requirement for leveling. The last two intervals between leveling operations were 9 and 12 hours.

The Lunar Surface Magnetometer is now indicating relatively constant flux as a function of time. This is favorable to the Site Survey measurement. Therefore, the third and fourth flip/cal operations were performed at 10:05 A.M. and 4:26 P.M. on 22 November and the Site Survey operation was started at 4:50 P.M. It was completed at 5:40 P.M. Completion of this one-time operation is a major scientific goal for the LSM. At 6:56 A.M. on 23 November the flip/cal inhibit was removed by command and the ALSEP 12-hour timer pulse activated a flip/cal operation. This is an important mode of operation. Instrument temperatures are stable about 2°C above the nominal range but this is not considered to be a problem. The LSM is operating in the filter-bypass mode; i.e., with the digital filter (one of three filters in the LSM) removed from the circuit by command.

The Solar Wind Spectrometer is operating normally with no major changes in measurements. This is consistent with the moon's location in the earth's magnetospheric tail. The instrument temperatures have stabilized about 10°C below the nominal value. This is not a problem. Housekeeping telemetry is being monitored for increased output of the SWS sun sensor which indicates when the sun is 60° above the horizontal referenced of the instrument (60° above lunar horizontal, if the instrument is level). Ideally, this should be detected at 2:00 P.M. on 23 November.

The Suprathermal Ion Detector continues in the "outgas" mode with instrument operational power on but high voltage power supplies commanded OFF. The Cold Cathode Ion Gauge is also continuing to operate with the 4500-volt power supply OFF. This mode of operation is planned until 27 November.

Dust Detector data continues to show a slight disagreement with expected values. The east sensor output is slightly lower than expected and the top sensor slightly higher. The west sensor is reading 10% full scale compared to the expected zero output. The latter may be explained by reflections from the adjacent painted surfaces.

Status at 7:00 A.M. is as follows:

Sun Angle	53.83°
Input Power	73.59 watts
Reserve Power	36.49 watts
Heaters and Power Dump Resistors	OFF
Experiment Status	All ON
Thermal Plate (Average)	90.7°F
PSE Sensor Assembly	126.6°F
LSM Sensors (Average)	55.81°C
Solar Wind Sensor Assembly	52.18°C
SIDE (Average)	69.25°C
CCIG	355.63°K

1 JEF
2 NAM D.Q.M.
3 - File

ALSEP DAILY SCIENCE REPORT
November 24, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function normally, with the equipments continuing to collect scientific data and performing at the predicted operational levels.

Central station performance continues to remain exceptionally stable, with the RTG power output remaining constant at 73.59 watts. Down-link signal strength continues steady at -139 dbm, with fluctuations of plus or minus one db. A total of 28 commands were addressed to the command decoder from Mission Control Center for various experiment adjustments during the past 24 hours. The average thermal plate temperature continues to increase at 0.1 degrees F per hour, with a value of 93.7 degrees F at 07:00 CST. This is 27 degrees F below the nominal prediction, but does not constitute a problem. Calibration status of the PSE changed at 18:58 CST on 23 November, indicating the arrival of the ninth 12-hour pulse from the ALSEP timer. The tenth pulse occurred at 06:56 CST, 24 November.

The Passive Seismic Experiment is detecting very little data that can be recognized as natural seismic disturbances or meteorite impacts. The instrument continues to operate with the feedback filter on the long period sensors commanded out of the circuit to correct the instability which was perturbing the vertical Z-Axis long period sensor. The temperature of the PSE sensor assembly continues to gradually increase at a rate of 0.03 degrees F per hour. All axes of the sensor have stabilized, with the last recentering of the long period components occurring fifteen hours ago.

The Lunar Surface Magnetometer remains in the geomagnetic tail and measures a time invariant magnetic field in both magnitude and direction. The instrument and sensor temperatures continue a slow rise rate of about 0.1 degrees C per hour. The LSM continues to operate in the full band pass mode with the digital filter removed from the circuit by command. Another flip/calibrate was executed successfully by the central station 12 hour timer command.

The Solar Wind Spectrometer continues to operate normally with no major changes in science data. SWS housekeeping telemetry indicated that the sun angle sensor output peaked at 18:05 CST on 23 November. The sun angle sensor indicates when the sun is above the horizontal reference of the instrument. Preliminary analysis of the sun sensor data indicates that the SWS was deployed to within 1.3 degrees of level, sloping toward West. The instrument rotates on one axis due to gravity forces to provide automatic leveling in the North/South direction at deployment.

The Suprathermal Ion Detector continues in the "outgas" mode with instrument operational power on but high voltage power supplies commanded OFF. The Cold Cathode Ion Gauge is also continuing to operate with the 4500-volt power supply OFF.

Dust detector data continues to show a slight disagreement with expected values. The East sensor output continues slightly lower than expected and the top sensor slightly higher. The West sensor is currently reading 14% full scale.

Status at 07:00 CST is as follows:

Sun Angle	61°
Input Power	73.59 watts
Reserve Power	35.14 watts
Heaters and Power Dump Resistors	OFF
Experiment Status	All On
Thermal Plate (Average)	93.7°F
PSE Sensor Assembly	127.3°F
LSM Sensor (Average)	64.2°C
Solar Wind Sensor Assembly	59.7°C
SIDE (Average)	73.4°C
CCIG	364.0°K

ALSEP DAILY SCIENCE REPORT
November 25, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function nominally, with scientific data being transmitted continuously from the seismometer, the magnetometer, and the solar wind spectrometer experiment sensors. Engineering data being transmitted from the central station and all experiments continues to be within the expected operational levels.

Central station operation continues to be extremely stable. C/S telemetry indicated that the average thermal plate temperatures peaked at 94.1 degrees F, and then continued a slow decrease rate of 0.05 degrees F per hour for 11 hours. Since 04:00 CST the average thermal plate temperature has stabilized at 93.7 degrees F. This is 33 degrees F below the nominal prediction, but does not constitute a problem. The RTG output continues steady at 73.59 watts. Downlink signal strength continues steady at -140 dbm, with fluctuations of plus or minus one db being reported. During the past 24 hours, 17 commands were transmitted to ALSEP for various experiment adjustments. Total commands transmitted to date is 502. The effects of the eleventh 12-hour timer pulse were seen in the telemetry at 18:59 CST on 24 November. The twelfth pulse occurred at 06:56 CST, 25 November.

The PSE recorded a significant seismic signal lasting two minutes in duration at 21:07 CST on 24 November. The seismic event was recorded by all PSE components. The feedback filter of the instrument remains commanded out of the circuit to correct the instability of the Z-axis long-period sensor. The temperature of the PSE sensor assembly continues to gradually increase at a rate of 0.01 degrees F per hour. Periodic recentering of the long-period components is required approximately every 15/16 hours, as all axes of the sensor have stabilized.

The Lunar Surface Magnetometer is operating satisfactorily and measured the passage of the moon from the geomagnetic tail through the magnetopause. Another flip calibrate operation was initiated by the 12-hour timer and completed at 07:05 CST. The electronics are now at 73 degrees C and continuing to rise at a rate of 0.15 degrees C per hour.

The Solar Wind Spectrometer continues to operate nominally with no significant change in scientific data noted as the moon approaches the magnetopause boundary of the earth. SWS engineering data reflects that the instruments temperature have been stabilized for the past 24 hours.

The Suprathermal Ion Detector continues in the "outgas" mode with instrument operational power on but high voltage power supplies commanded OFF. The Cold Cathode Ion Gauge is also continuing to operate with the 4500-volt power supply OFF. The SIDE temperatures continue to increase at a rate of 0.4 degrees C per hour, while the CCIG temperature has remained at 364.0 degrees K during the past 24 hours.

The Dust Detector East sensor output continues to track lower than expected and the top sensor higher than predicted. The West sensor is currently reading 15% full scale.

Status at 07:00 CST is as follows:

Sun Angle	81°
Input Power	73.59 watts
Reserve Power	36.22 watts
Heaters and Power Dump Resistors	OFF
Experiment Status	All ON
Thermal Plate (Average)	93.5°F
PSE Sensor Assembly	127.7°F
LSM Sensor (Average)	69.6°C
Solar Wind Sensor Assembly	59.7°C 5
SIDE (Average)	76.3°C
CCIC	364.0°K

ALSEP DAILY SCIENCE REPORT
November 26, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

Seven days after being placed on the lunar surface by the crew of Apollo 12, ALSEP continues to collect scientific data and transmit it to earth.

The central station shows normal performance, continuing to remain exceptionally stable. The RTG hot frame temperature (AR-01) which went off scale high, exceeding 1149 degrees F on 21 November, returned at 07:50 CST, 25 November, and has remained constant at 1147 degrees F for the past 24 hours. RTG output continues steady at 73.59 watts. C/S telemetry indicates that the average thermal plate temperatures have gradually increased to and stabilized at 94.1 degrees F as the ALSEP experienced lunar noon. The central station temperature has been stabilized for the past 17 hours. The stabilized temperature is 35 degrees below the nominal prediction. Downlink signal strength continues steady at -140 dbm, with fluctuations of plus or minus one db being reported. A total of 12 commands were addressed to the command decoder from Mission Control Center for seismometer and magnetometer experiment adjustments during the past 24 hours. The thirteenth 12-hour timer pulse was seen at 19:00 CST on 25 November, with the fourteenth pulse occurring at 06:56 CST, 26 November.

No significant seismic activity has been observed. The PSE sensor assembly continues to gradually increase at a rate of 0.09 degrees F per hour, with a value of 130.0 degrees F at 07:00 CST. The PSE sensor heater was commanded to the off mode at 08:33 CST on 25 November, in an attempt to minimize the sensor temperature increase. The instrument continues to operate in a nominal configuration with the feedback filter on the long-period sensors commanded out of the circuit. Last recentering of the long components occurred 38 hours ago, as all axes of the sensor remain stabilized.

The Lunar Surface Magnetometer is presently indicating that the moon is in the transition region behind the earth's magnetic bow shock. Two more flip calibrate sequences were performed and the temperatures stabilized at 70 degrees C during lunar noon.

The Solar Wind Spectrometer continues to operate nominally with some fluctuations in scientific data noted as the moon continues passing through the magnetopause boundary of the earth. SWS engineering data indicates that the electronics temperature remains stabilized, while the sensor assembly temperature increased 4 degrees during the past 24 hours. The sensor assembly temperature currently reads 63.7 degrees C, and has held constant for the past 19 hours.

The Suprathermal Ion Detector and Cold Cathode Ion Gauge continue to operate in the "outgas" mode with instrument operational power ON but high voltage power supplies commanded OFF. The SIDE temperatures essentially have stabilized while the CCIG temperature has increased to 372.6 degrees K during the past 24 hours.

The Dust Detector East sensor output bottomed out at approximately 16:00 CST on 25 November. The top sensor output peaked at 18:00 CST on 25 November indicating that the sun was directly overhead. The West sensor output is currently reading 20% full scale, and increasing rapidly.

Status at 07:00 CST is as follows:

Sun Angle	94°
Input Power	73.59 watts
Reserve Power	37.30 watts
Heaters and Power Dump Resistors	OFF
Experiments Status	All ON
Thermal Plate (Average)	93.9°F
PSE Sensor Assembly	130.0°F
LSM Sensor (Average)	71.3°C
Solar Wind Sensor Assembly	63.7°C
SIDE (Average)	75.4°C
CCIG	372.6°K

ALSEP DAILY SCIENCE REPORT
November 27, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function nominally, with scientific data being transmitted continuously as the moon passes through the transition region behind the earth's magnetic bow shock.

Central station performance remains exceptionally stable, with the RTG power output remaining constant at 73.59 watts. The RTG hot frame temperature (AR-01) went OFF scale high, exceeding 1149 degrees F, at 16:00 CST, 26 November. It is predicted that the two hot frame temperatures (AR-01 and AR-03) will cycle ON scale and OFF scale, as a function of sun angle, during the lunar day, and then return ON scale throughout the lunar night.

TM Point	Status	Sun Angle
AR-01	ON Scale	8°
AR-01	OFF Scale	30°
AR-01	ON Scale	82°
AR-01	OFF Scale	98°
AR-03	ON Scale	8°
AR-03	OFF Scale	8°

Central station telemetry indicates that the average thermal plate temperatures have gradually increased over the past 24 hours, at a rate of 0.09 degrees F per hour. The C/S temperature has been stabilized for the past 41 hours at a temperature approximately 35 degrees F under the nominal prediction. Downlink signal strength continues steady at -140 dbm, with variations of plus or minus one db depending upon which remoted site is supporting ALSEP. During the past 24 hours, nine commands were transmitted to ALSEP for various experiment adjustments. The fifteenth 12-hour timer pulse was observed on 19:00 CST, 26 November, with the sixteenth pulse occurring at 06:56 CST on 27 November.

The Passive Seismic Experiment has recorded no significant seismic activity since the last reporting period. The PSE sensor assembly temperature continues to increase at a rate of 0.05 degrees F per hour. The PSE sensor heater, commanded to the OFF mode 48 hours ago in an attempt to minimize the sensor temperature increase, remains OFF. Last releveling of the long-period sensors occurred 62 hours ago, as all axes of the sensor remain stabilized.

The Lunar Surface Magnetometer continues operating satisfactorily and measuring considerable activity on all axes as the moon moves into the earth's magnetic bow shock. To date 17 flip calibration sequences have been executed successfully by the instrument. The instrument and sensor temperatures remain stabilized.

The Solar Wind Spectrometer continues to operate nominally with some fluctuations in scientific data noted. Housekeeping data indicates that the electronics temperature remains stabilized, while the sensor assembly temperature decreased four degrees over the past 24 hours.

The Suprathermal Ion Detector and Cold Cathode Gauge continue to operate in the "outgas" mode. The SIDE electronics temperatures have shown a very slight increase, while the Cold Cathode Gauge temperature has remained constant since the last reporting period.

The output of the west cell of the Dust Detector continues to increase rapidly, currently reading 31% full scale, while the east cell output remains constant at a low reading. The top cell output continues a slow decline.

Status at 07:00 CST is as follows:

Sun Angle	106°
Input Power	73.59 watts
Reserve Power	35.68 watts
Heaters and Power Dump Resistors	OFF
Experiments Status	All ON
Thermal Plate (Average)	96.0°F
PSE Sensor Assembly	132.1°F
LSM Sensor (Average)	70.9°C (159.6°F)
Solar Wind Sensor Assembly	59.7°C (139.5°F)
SIDE (Average)	75.9°C (170.6°F)
CCIG	372.6°K (211.3°F)

ALSEP DAILY SCIENCE REPORT
November 28, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function nominally, with the equipments continuing to collect scientific data as the moon continues to pass through the earth's magnetic bow shock into interplanetary space.

Central station operation continues to be outstanding, with all bus voltages and component temperatures remaining exceptionally stable. C/S telemetry indicates that the average thermal plate temperatures have gradually increased to and stabilized at 97.3 degrees F as the AISEP experiences a sun angle of 118 degrees. The current central station temperature has been stabilized for the past 13 hours, and is 23 degrees below the nominal predicted temperature at the sun angle. The RTG output continues steady at 73.59 watts. The downlink signal strength remains steady at -140 dbm, with fluctuations of plus or minus one dbm being reported. During the past 24 hours, eight commands were transmitted to ALSEP for seismometer experiment adjustments. Total commands transmitted to date is 531. Calibration status of the PSE changed and LSM executed another successful flip calibration sequence at 19:00 CST on 27 November, indicating the arrival of the seventeenth 12-hour pulse from the ALSEP timer. The eighteenth occurred at 06:56 CST, 28 November.

The Passive Seismic Experiment has recorded no significant seismic activity since November 24. The PSE sensor assembly temperature continues to increase at a rate of 0.04 degrees F per hour. The PSE sensor heater remains OFF, commanded to the OFF mode 72 hours ago in an attempt to minimize the sensor temperature increase. Releveling of the Y axis long-period sensor was successfully executed at 21:40 CST on 27 November. Last releveling of the X and Z axes long-period sensors occurred 76 hours prior to the Y axis releveling sequence.

The Lunar Surface Magnetometer continues to measure considerable activity on all axes as the moon moves through the earth's magnetic bow shock into interplanetary space. LSM housekeeping telemetry indicated that the instrument electronics and sensors temperatures peaked, and since the last reporting period the temperatures have continued a slow decrease rate of 0.16 degrees C per hour.

The Solar Wind Spectrometer continues to operate nominally with very limited fluctuations of scientific data in the proton levels noted. The sensor assembly temperatures have continued to decrease at a rate of 0.03 degrees C per hour over the last 24 hours.

The Suprathermal Ion Detector and Cold Cathode Gauge continue to operate nominally in the "outgas" mode. The SIDE electronics temperatures and Cold Cathode Gauge temperatures remained stabilized during the past 24 hours.

The output of the west cell of the Dust Detector continues to increase rapidly, currently reading 53% full scale, while the east cell output remains constant at a low reading of 4%. The top cell output continues a slow decline.

Status at 07:00 CST is as follows:

Sun Angle	118°
Input Power	73.59 watts
Reserve Power	36.22 watts
Heaters and Power Dump Resistors	OFF
Experiments Status	All ON
Thermal Plate (Average)	97.2°F
PSE Sensor Assembly	133.62°F
LSM Sensor (Average)	65.3°C (149.5°F)
Solar Wind Sensor Assembly	59.0°C (138.2°F)
SIDE (Average)	73.8°C (164.8°F)
CCIG	372.6°K (211.3°F)

ALSEP DAILY SCIENCE REPORT
November 29, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

Ten days after placement on the lunar surface by the Apollo 12 crew, ALSEP continues to function nominally, with scientific data being transmitted to Earth continuously. The Moon passed out of the Earth's magnetic bow shock on 28 November and is now under the Sun's influence in interplanetary space.

Central station data remains nominal with all voltages and temperatures within the expected operational levels. The C/S average thermal plate temperature continues to decrease at a rate of 0.17 degrees F per hour, after having peaked at 97.2 degrees F at 2100 CST, 28 November. RTG output continues steady at 73.59 watts. Mission Control Center exercised its dual downlink mode capability in support of ALSEP and the PSEP sunset. Texas reports a ALSEP signal strength of -140 dbm, and PSEP signal strength at -139 dbm. Sixteen commands were transmitted to ALSEP for various experiment adjustments, over the last 24 hours. ALSEP has now received and executed a total of 545 commands. The nineteenth 12-hour pulse occurred at 19:00 CST on 28 November, and the twentieth pulse at 06:56 CST, 29 November.

The Passive Seismic Experiment has recorded no significant seismic activity since the last reporting period. The PSE sensor assembly temperature peaked at 133.9 degrees F at 21:00 CST, 28 November, and since then continued a slow decrease rate of 0.03 degrees F per hour. The PSE sensor heater remains in the OFF mode. Releveling of the X and Z axes long-period sensors occurred 80 hours prior.

The Lunar Surface Magnetometer continues operating satisfactorily and is measuring characteristics of interplanetary magnetic fields. LSM housekeeping telemetry indicates that the instrument electronics and sensor temperatures have continued to decrease at a rate of 0.3 degrees C per hour. To date 22 flip calibration sequences have been successfully executed by the instrument, with the last execute from the 12-hour pulse arriving 13 seconds earlier than expected.

The Solar Wind Spectrometer continues to operate nominally with very limited activity. The sensor assembly temperatures have continued to decrease at a rate of 0.3 degrees C per hour over the last 24 hours.

The Suprathermal Ion Detector and Cold Cathode Gauge continue to operate nominally in the "outgas" mode. The instruments high voltage power supplies will not be commanded on until sufficient cooling has occurred to minimize the effects of outgassing. The SIDE temperatures remain stabilized, while the CCIG temperature has decreased to 364.0 degrees K during the past 24 hours.

The dust detector data continues to show disagreement with the predicted values. The output of the west cell continues to track higher than predicted, while the top cell output continues a slow decline tracking under the predicted values. The east cell output remains constant at a low reading of 4% full scale.

Status at 0700 CST is as follows:

Sun Angle	127°
Input Power	73.59 watts
Reserve Power	36.22 watts
Heaters & Dump Resistors	OFF
Experiments Status	ALL ON
Thermal Plate (Average)	92.9°F
PSE Sensor Assembly	133.52°F
LSM Sensor (Average)	70.5°C (158.90°F)
Solar Wind Sensor Assembly	55.8°C (126.1°F)
SIDE (Average)	73.5°C (162.5°F)
CCIG	364.0°K (195.8°F)

ALSEP DAILY SCIENCE REPORT
November 30/December 1, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function nominally, with scientific data being transmitted continuously from the seismometer, the magnetometer, and the solar wind spectrometer experiment sensors. Engineering data being transmitted from the central station and all experiments continues to be within the expected operational levels.

Central station operation continues in agreement with predictions. C/S telemetry indicated that the average thermal plate temperatures peaked at 97.2 degrees F. Over the past 48 hours the thermal plate temperature has been decreasing at a rate of 0.5 degrees F per hour and continuing, with a value of 73.1 degrees F at 07:00 CST. The current temperature is 8 degrees F below the nominal prediction and not a cause for concern. The RTG output continues steady at 73.59 watts. The two hot frame temperatures, AR-01 and AR-03, which were OFF scale high, exeeding 1149 degrees F, returned ON scale at 09:30 CST, 30 November, and 02:49 CST, 1 December, respectively. Since returning ON scale AR-01 and AR-03 have continued to decrease slowly over the past few hours, with a value of 1145(AR-01)and 1146 (AR-03) degrees F at 07:00 CST. Throughout the lunar night the two hot frame temperatures should remain ON scale.

TM Point	Status	Sun Angle
AR-01	ON Scale	8°
AR-01	OFF Scale	30°
AR-01	ON SCale	82°
AR-01	OFF Scale	98°
AR-01	ON Scale	143°
AR-03	ON Scale	8°
AR-03	OFF Scale	8°
AR-03	ON Scale	152°

The downlink signal strength remains steady at -140 dbm, with fluctuations of plus or minus one db depending upon which remoted site is supporting ALSEP. Due to a Mission Control Center in-house operational readiness and confidence test, real time support was terminated from 00:00 CST - 02:45 CST on 1 December. During the termination period all ALSEP data continued to be taped by the remoted site. The 21st, 22nd and 23rd 12-hour pulses from the ALSEP timer occurred as predicted. The 24th occurred at 06:56 CST, 1 December. During the past 48 hours, 26 commands were transmitted to ALSEP for siesmometer and magnetometer experiment adjustments. Total commands transmitted to date is 567.

The Passive Seismic Experiment has recorded no significant seismic activity during the past 48 hours. The feedback filter of the instrument remains

commanded out of the circuit to correct the instability of the Z-axis long-period sensor. The PSE heater remains OFF. The PSE telemetry indicated that the sensor assembly temperature peaked at 133.9 degrees F. A decrease rate of 0.12 degrees F per hour for the past 48 hours continues, with the sensor assembly having a value of 127.8 degrees F at 06:00 CST. The last releveling of the three long-period sensors was successfully completed 35 hours ago.

The Lunar Surface Magnetometer continues to operate nominally, and is measuring characteristics of the interplanetary magnetic fields. Housekeeping telemetry indicates that the instrument electronics and sensor temperatures continue to decrease at a rate of 0.8 degrees per hour over the past 48 hours. To date 27 flip calibration sequences have been executed successfully by the instrument.

The Solar Wind Spectrometer continues to operate nominally with limited fluctuations of scientific data in the proton levels noted. The sensor assembly temperature continues to decrease at a rate of 0.2 degrees C per hour during the past 48 hours.

The Suprathermal Ion Detector and Cold Cathode Gauge continue to operate nominally in the "outgas" mode. The SIDE electronic temperatures are decreasing at a rate of 0.3 degrees C per hour, while the CCIG temperature has decreased to 347.4 degrees K during the past 48 hours.

The dust detector data west cell output continues to track higher than predicted data, while the top cell output continues a slow decline tracking under the predicted values. The east cell output remains constant at a low reading of 3% full scale.

Status at 07:00 CST is as follows:

Sun Angle	154°
Input Power	73.59 watts
Reserve Power	37.03 watts
Heaters and Power Dump Resistors	OFF
Experiments Status	All ON
Thermal Plate (Average)	73.1°F
PSE Sensor Assembly	127.7°F
LSM Sensor (Average)	31.7°C (88.9°F)
Solar Wind Sensor Assembly	48.8°C (119.14°F)
SIDE (Average)	56.7°C (133.9°F)
CCIG	347.4°K (164.9°F)

ALSEP DAILY SCIENCE REPORT
December 2, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function nominally with all equipment collecting scientific data as the moon passes through interplanetary space.

Central station data remains nominal with all voltages and temperatures within the expected operational levels. Central station telemetry indicates that the average thermal plate temperature continues to decrease at a rate of 0.65 degrees F per hour, with the current temperature approximately 7 degrees below the nominal predicted temperature at the current sun angle. Downlink signal strength continues at -140 dbm. The RTG output remains steady at 73.59 watts. A total of 39 commands were addressed to the command decoder from Mission Control Center for various experiment adjustments during the past 24 hours. The effects of the 25th 12-hour timer pulse was seen in the telemetry at 18:59 CST on 1 December. The 26th pulse arrived at 06:56 CST, 2 December.

No significant seismic activity has been recorded by the Passive Seismic Experiment since the last reporting period. The PSE sensor assembly temperature continues to gradually decrease at a rate of 0.03 degrees F per hour, with a value of 126.8 degrees F at 06:00 CST. The PSE sensor heater was commanded to the thermal control mode of Auto ON at 08:18 CST on 1 December, in an attempt to minimize the sensor temperature decrease. Releveling of the Y axis and Z axis long-period sensors was successfully executed at 07:19 CST, 1 December. Periodic releveling of the long-period sensors will be required with increasing frequency until all axes of the sensor stabilize during lunar night.

The Lunar Surface Magnetometer continues operating satisfactorily, as the instrument and sensor temperatures decrease as lunar night approaches. The instrument temperature rate of decrease is approximately 0.5 degrees C per hour, while the sensors temperature decreases gradually at 0.1 degrees C per hour.

The Solar Wind Spectrometer continues to operate successfully in the undisturbed solar wind region measuring nominal solar wind properties. The SWS was commanded to its high gain mode, in a series of command sequences, at 11:44 CST, 1 December, and then re-initialized to its nominal operational mode at 12:20 CST. The command sequence verified background data in both the nominal mode and high gain mode, with the receiving of functional verification. The sensor assembly temperature continues to decrease at a rate of 0.4 degrees C per hour.

The Suprathermal Ion Detector and Cold Cathode Gauge continue to operate nominally transmitting housekeeping data. The SIDE electronics temperatures

are decreasing at a rate of 0.5 degrees C per hour, while the CCIG temperature has decreased to 339.4 degrees K over the last 24 hours.

The dust detector data continues to show disagreement with the predicted values. The output of the west cell is tracked above predicted values, until 04:00 CST, 2 December, when the cell output peaked at -141.0 millivolts. Since peaking, the west cell output is decreasing at a rate of -6.0 millivolts per hour, and is now tracking under the predicted curve. The top cell output continues to decline; tracking below predicted values. The east cell output remains constant at a low reading of 3% full scale.

Status at 07:00 CST is as follows:

Sun Angle	166°
Input Power	73.59 watts
Reserve Power	32.97 watts
Heaters & Power Dump Resistors	OFF
Experiments Status	ALL ON
Thermal Plate (Average)	56.6°F
PSE Sensor Assembly	126.7°F
LSM Sensor (Average)	29.8°C (80.6°F)
Solar Wind Sensor Assembly	16.4°C (61.5°F)
SIDE (Average)	44.1°C (111.3°F)
CCIG	339.4°K (151.4°F)

NOTE: Please make correction on the ALSEP Daily Science Report dated November 29, 1969. The last sentence in the third paragraph should read thus:

> "Releveling of the X and Z axes long-period sensors was successfully executed at 11:22 CST on 28 November. The last releveling of the X and Z axes long-period sensors occurred 80 hours prior."

ALSEP DAILY SCIENCE REPORT
December 3, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

As the first lunar sunset on ALSEP approaches, the system continues to collect scientific data and transmit it to Earth.

Central station performance remains nominal; however, all temperatures are decreasing rapidly as lunar sunset on the deployment site is imminent. C/S internal temperatures are dropping at a rate of 1.0 degrees F per hour, while external temperatures indicate a rate of decrease of approximately 5-10 degrees F per hour. The average thermal plate temperature remains within expected operational levels, tracking slightly below the nominal predicted temperature at the current low sun angle. The RTG output continues steady at 73.59 watts. The downlink signal strength remains steady at -140 dbm, with fluctuations of plus or minus one dbm being reported. The 27th twelve-hour timer pulse occurred at 18:59 CST on 2 December, and the 28th pulse at 06:55 CST, 3 December. During the past 24 hours, a total of 52 commands were transmitted to ALSEP for adjusting experiments.

The Passive Seismic Experiment recorded a minor seismic signal of approximately 20 minutes duration at 08:00 CST on 2 December. The seismic event was detected by the three long-period sensors. An apparent anomaly appeared at 07:00 CST, 2 December, when a continuous train of pulses appeared on the short-period vertical axis. The effects of the pulses can be seen on the three long-period horizontal axes, indicating that some crosstalk exists in the instrument. However, this anomaly occurs only when the SP-Z axis is in the zero db gain setting. When the pulses first appeared they had a duty cycle of approximately 10%; however, they have progressively increased to a duty cycle of 100% in ten hours, and now appear as continuous noise on the trace. The PSE sensor assembly temperature continues to gradually decrease at a rate of 0.02 degrees F per hour, with a value of 126.2 degrees F per hour at 06:00 CST. Releveling of the Y axis and Z axis long-period sensors was successfully executed within the last 24 hours.

The Lunar Surface Magnetometer continues to operate nominally, collecting characteristics of interplanetary magnetic fields. The LSM was transferred to Y thermal control mode from X thermal control mode at 17:25 CST on 2 December, and will likely remain there during lunar night. The duty cycle of the Y thermal control mode is higher as during the past 24 hours the sensor temperature has gradually increased to 36.9 degrees C, and has been stable at this value for the past eight hours. The internal and base temperatures of the instrument have decreased 13-16 degrees C during the past 24 hours.

The Solar Wind Spectrometer continues to operate successfully, measuring solar wind properties. The sensor assembly temperature continues to decrease at a rate of 0.8 degrees C per hour.

The Suprathermal Ion Detector Channeltron high voltage was commanded ON at 18:33 CST, 2 December, and has been operating successfully since that time. SIDE housekeeping telemetry indicates that the electronics temperatures continue to decrease at a rate of 0.5 degrees C per hour. Cold Cathode Gauge high voltage turn ON was attempted at 19:06 CST on 2 December and was unsuccessful. Further attempts to initiate the CCIG high voltage were exercised during the following hour, by transmitting a series of commands, all of which proved to be unsuccessful. Both methods of turn ON were attempted, i.e., the normal sequence of commands (104, 106, 107, 110), and reinitialization by commanding the experiment to Standby and back ON. The CCIG temperature has decreased 31 degrees K over the last 24 hours.

The top Dust Detector cell output reached its minimum value at 22:00 CST on 2 December, reading the same as the east facing cell. The west facing cell in approaching its peak output of -141.0 millivolts encountered shadowing at 04:00 CST on 2 December, and has had variable outputs since that time. The pattern is very similar to that seen on PSEP cells during their shadowed periods. It is expected that the west facing cell output will drop rapidly giving a good indication of lunar sunset.

Status at 07:00 CST is as follows:

Sun Angle	179°
Input Power	73.59 watts
Reserve Power	29.99 watts
Heaters and Power Dumps	OFF
Experiment Status	All ON
Thermal Plate (Average)	32.9°F
PSE Sensor Assembly	126.2°F
LSM Sensor (Average)	36.9°C (98.5°F)
SWS Sensor	-3.45°C (+25.8°F)
SIDE (Average)	27.3°C (81.1°F)
CCIG	308.8°K (96.4°F)

ALSEP DAILY SCIENCE REPORT
December 4, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP is now 21 hours into its first lunar night and continues to function nominally. Sunset occurred at 09:45 CST, 3 December, within minutes of the predicted time.

The central station is operating satisfactorily at the lowest temperatures it has experienced thus far since being activated 15 days ago on the moon. The temperatures continued to drop rapidly after sunset with the lowest readings being the sunshield sensors at -281 degrees F. The average thermal plate temperatures appear to be leveling off as they approach zero degrees F. The thermostatic heater was commanded ON at 08:41 CST on 3 December to insure that it is enabled; however, the C/S temperature has not dropped low enough yet to activate the heater. At present no C/S heaters are ON.

The Dust Detector west facing cell output dropped rapidly to off scale low, at 09:45 CST on 3 December, giving an accurate indication of lunar sunset.

RTG output power is steady at 74.14 watts following slight fluctuations noted on C/S telemetry during lunar sunset.

An apparent anomaly appeared with the occurrence of the 29th twelve-hour pulse. The only indication of the twelve-hour pulse was the successful flip calibration sequence of the LSM sensors at 19:05 CST, 3 December. Calibration status of the PSE did not change with the arrival of the 29th twelve-hour pulse. The same anomaly occurred with the 30th twelve-hour pulse at 06:58 CST on 4 December, followed by spurious LSM flip calibration sequence at 07:16 CST.

The downlink signal strength remains at -140 dbm. During the past 24 hours, 52 commands were transmitted to ALSEP for various experiment adjustments. Total commands transmitted to date is 714.

The Passive Seismic Experiment recorded an episode of large tilts (both tides and tilts) on the X axis and Y axis long-period horizontal sensors lasting approximately one hour and coinciding with terminator crossing. The PSE sensor assembly temperature continues to decrease at a rate of 0.3 degrees F per hour, with a value of 122.8 degrees F at 06:00 CST. The PSE sensor heater was commanded to the forced ON mode at 17:37 CST on 3 December, in an attempt to minimize the sensor temperature decrease. Periodic releveling of the long-period sensors was required approximately every two to four hours following lunar sunset.

The Lunar Surface Magnetometer continues operating satisfactorily, with the digital filter commanded IN. LSM housekeeping telemetry indicates that the sensor temperatures have stabilized, while the instrument internal temperatures have continued to decrease at a rate of 1.0 degree C per hour. To date 38 flip calibration sequences have been successfully executed by the instrument, including the two twelve-hour timer spurious flip calibration sequences. Upon receipt of the spurious flip cal, the flip cal inhibit command was transmitted.

The Solar Wind Spectrometer continues to operate nominally. The sensor assembly temperature continues to decrease at a rate of 1.0 degree C per hour.

The Suprathermal Ion Detector continues to operate normally with high voltage on. SIDE housekeeping telemetry indicates that the electronics temperatures continue to decrease at a rate of .97 degrees C per hour. Cold Cathode Gauge high voltage turn ON was attempted at 10:42 CST on 3 December and was unsuccessful. Further attempts to initiate the CCIG high voltage were exercised during the following hour, by transmitting a series of commands, all of which proved to be unsuccessful. Both methods of turn ON were attempted, i.e., the normal sequence of commands (104, 106, 107, 110), and reinitialization by commanding the experiment to Standby and back ON. The CCIG temperature has decreased 182.86 degrees K over the last 24 hours. It is undetermined at this time as to whether the CCIG high voltage ON commands will be attempted during the lunar night.

Status at 07:00 CST is as follows:

Sun Angle	191°
Input Power	74.14 watts
Reserve Power	29.99 watts
Heater and Power Dumps	OFF
Experiment Status	All ON
Thermal Plate (Average)	1.9°F
PSE Sensor Assembly	122.8°F
LSM Sensors (Average)	36.2°C (97.1°F)
SWS Sensor	-129.0°C (-200.2°F)
SIDE (Average)	4.0°C (39.2°F)
CCIG	125.94°K (-232.8°F)

ALSEP DAILY SCIENCE REPORT
December 5, 1969

Apollo Lunar Surface Experiments Package Status Report - 7:00 CST

The measurements that have been received from ALSEP 1 during the last 24 hours are providing uniquely valuable data on the lunar night environment. The central station electronics bay stabilized in temperature at approximately 1.5°F within 18 hours after sunset. This temperature is being maintained despite the fact that the structure surrounding this bay is at a temperature of -125°F and the sunshield, which is more completely isolated, is indicated to be at -290°F. No electrical heaters have been necessary to support the static thermal control of the electronics units in the central station.

The RTG output has remained steady at 74.14 watts reflecting the stability of the thermal environment and the slightly higher efficiency of a thermoelectric generator at lunar night.

The signal received from ALSEP 1 is reported by the remoted sites at -135 to -140 dbm, depending on the site. Only routine command activity occurred during this period to calibrate the LSM and level the PSE. There were 38 commands sent and implemented making a grand total of 752 commands executed by ALSEP 1.

Two of the three nominal indications of the 31st 12-hour pulse being issued by the timer were observed in MCC at 01:05 GMT on 5 December. These indications consisted of the PSE short-period Z-axis sensor operation changing to the calibrate mode and the LSM going into the Flip/Cal mode. Although there is no doubt that the timer functioned normally during the previous two 12-hour events, an analysis is underway to determine possible causes for the lack of response of the PSE circuitry at those times. During previous such events an additional indication of the occurrence of the 12-hour pulse was provided by a change in the PSE Caged/Uncaged status display. This indication was not provided with the 31st pulse.

The temperature of the PSE sensor has remained near 121°F most of this period. The temperature rose to almost 125° for a part of that time when the Z-axis leveling motor was left in the auto-leveling mode for several hours. No seismic events have been identified during this past 24 hours.

The temperatures of the LSM sensors appear to have stabilized at approximately 36°C, while the instrument internal temperature has slowly leveled off at approximately -22°C. No unusual magnetic field measurements have been reported during this period.

The Solar Wind Spectrometer is operating at a well-stabilized temperature of approximately -15°C for the electronics and -130°C for the sensor. Because the spectrometer is shielded from the sun's rays, the level of sensed activity is below the threshold of the instrument.

The Suprathermal Ion Detector continues to operate in full functional mode with high voltage on. The various temperature measurements associated with the instrument have remained constant throughout this reporting period. Since the high voltage is inoperative in the CCIG no lunar atmospheric measurement is being provided.

Status at 07:00 CST is as follows:

Sun Angle	203°
Input Power	74.14 watts
Reserve Power	35.41 watts
Heater and Power Dumps	OFF
Experiment Status	All ON
Thermal Plate Temperatures (Average)	0.14°F
PSE Sensor Temperature Assembly	119.6°F
LSM Sensor Temperatures (Average)	34.9°C (94.1°F)
SWS Sensor Temperature	-131.7°C (-268.7°F)
SIDE Temperatures (Average)	3.6°C (38.3°F)
CCIG Temperature	112.3°K (257.8°F)

ALSEP DAILY SCIENCE REPORT
December 6, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP 1 system continues transmitting scientific and engineering data to earth more than 400 hours after placement on the lunar surface. The central station and all experiments continue to function well within expected operational levels. The scientific sensors of ALSEP 1 continue to indicate a very low level of seismic, magnetic and particle field activity.

The instruments have established thermal equilibrium in the lunar night environment, with the central station external sunshield temperature sensor indicating -291.9°F. The temperature of the Passive Seismic Experiment sensor assembly continues to decrease as lunar midnight approaches, but this trend was reversed at a temperature of 110°F by the activation of the automatic leveling circuit (Z axis motor). Further use of the automatic leveling circuit is to be discontinued as the instruments science trend is disturbed too frequently.

The RTG has been providing a stable supply of adequate power (74 watts). The 10 wattsheater (DSS Heater 1) in the central station electronics bay was activated by command at 17:22 CST on 5 December. This is standard operating procedure when the average thermal plate temperature drops below 0°F. The average temperature of the plate has since risen to 21°F and is still rising slightly.

During the past 24 hours, 10 commands were addressed to the command decoder and implemented, bringing the total number of commands executed by ALSEP 1 since it was deployed to 762. The downlink signal strength remains at -140 dbm.

The last three 12-hour pulses from the timer have provided the following sequence of operational mode changes:

DATE	PULSE No.	PSE STATUS SP CAL	PSE STATUS CAGE	TIME	LSM FLIP/CAL NO.	LSM FLIP/CAL TIME	C/S AVG. TEMP.
5 Dec	32	Change	No Change	12:56Z			
		Change	No Change	13:01Z	42	13:03Z	0.14°F
6 Dec	33	Change	No Change	01:01Z	44	01:03Z	9.9°F
6 Dec	34	Change	Change	12:56Z	45	13:01Z	21.0°F

This latest event (pulse 34) provided all the expected changes. It would appear that the unusual reactions of the system to previous 12-hour timer pulses are a function of the central station temperature.

Status at 07:00 CST is as follows:

Sun Angle	215°
Input Power	73.98 watts
Reserve Power	16.26 watts
Heater and Power Dumps	10 watts ON
Experiment Status	All ON
Thermal Plate Temperatures (Average)	21.0°F
PSE Sensor Assembly Temperature	109.9°F
LSM Sensor Temperatures (Average)	35.4°C (95.7°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SIDE Temperatures (Average)	3.6°C (38.3°F)
OCIC Temperatures	108.3°K (-265.3°F)

ALSEP DAILY SCIENCE REPORT
December 7/December 8, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

ALSEP scientific sensors of ALSEP 1 have been indicating low levels of activity over the past 48 hours. Periodic calibrations reveal that performance levels are satisfactory on all instruments, except the CCIG which does not yet have its high voltage supply re-activated.

Only the PSE sensor has not stabilized in temperature after almost 5 days of operation in the lunar nighttime evnironment. The PSE sensor temperature measurement went off scale LOW at 108°F at 19:00 CST on 6 December. The rate of decrease of temperature displayed at that time would indicate that the present temperature is approximately 100°F. It is expected that the temperature will stabilize near 85°F. The day/night temperature swing does not impair the functioning of the instrument, but does make interpretation of gravitational tidal data exceedingly difficult. One brief seismic event appeared on the short-period sensor data displays on 7 December.

All temperatures measured on the central station (within the electronic units, on the thermal plate and on the external structure) have remained constant within a degree for the past two days. Although the lunar night environment is severe, it is very constant once the sun goes down.

A review of the command history of ALSEP 1 has been initiated to determine the performance of the command verification function. No command transmitted to the system has failed to be implemented but, as occurred during PSEP operation and recent ground tests, spurious values of the command verification word have been received by the network. To date a total of 786 commands have been implemented by ALSEP.

The 12-hour timer continues to function on schedule and since the central station electronics bay has stabilized above 20°F all telemetered indications of the existence of the timer pulse are normal.

Status at 07:00 CST was as follows:

Sun Angle	239°
Input Power	73.98 watts
Reserve Power	15.17 watts
Heater and Power Dumps	10 watts ON
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.4°F
PSE Sensor Assembly Temperature	OFF Scale LOW
LSM Sensor Temperature (Ave.)	35.6°C (95.7°F)
SWS Sensor Temperature	-134.8°C (-209.7°F)
SIDE Temperatures (Average)	3.4°C (37.4°F)
CCIG Temperature	104.7°K (-267.7°F)

ALSEP DAILY SCIENCE REPORT
December 9, 1969

Apollo Lunar Surface Experiments Package Status-08:00 CST

ALSEP 1 is now 142 hours into its first lunar night and continues to operate as expected.

Central station telemetry indicates that the average thermal plate temperature remains stabilized at 22.6 degrees F. The RTG output continues steady at 73.98 watts. Downlink signal strength remains steady at -140 dbm with fluctuations of plus or minus one dbm depending upon which remoted site is supporting ALSEP. The 39th 12-hour pulse occurred at 18:57 CST on 8 December, and the 40th pulse at 06:57 CST, 9 December.

A total of 56 commands have been transmitted to ALSEP over the past 24 hours. A series of 24 commands were transmitted to the Passive Seismic Experiment to check the reaction of the short-period Z-axis sensor. A set of 12 commands was transmitted at 10 second intervals, with the other 12 commands sent at 2 second intervals. These commands were sent while the SP-Z axis gain was at -30 db. The command sequence was not successful in producing a normal CAL pulse response.

All the experiments continue to function well within expected operational levels, with the scientific sensors of ALSEP 1 continuing to indicate a very low level of seismic, magnetic and particle field activity.

Status at 07:00 CST was as follows:

Sun Angle	247°
Input Power	73.98 watts
Reserve Power	15.44 watts
Heater and Power Dumps	10 watt ON (DSS1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.6°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.6°C (95.7°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SIDE Temperatures (Average)	3.4°C (37.4°F)
CCIG Temperature	104.7°K (-267.7°F)

NOTE: Please make correction on the ALSEP DAILY SCIENCE REPORT dated December 7/December 8, 1969. The last sentence in the second paragraph should read thus:

"The PSE detected a seismic signal lasting thirty-five minutes in duration at 19:45 CST on 8 December. The seismic event was recorded on the three long-period sensors."

Status at 07:00 CST was as follows:

Sun Angle	261°
Input Power	73.98 watts
Reserve Power	15.17 watts
Heater and Power Dumps	10 watt ON (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.4°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.4°C (95.0°F)
SWS Sensor Temperature	-134.3°C(-209.7°F)
SIDE Temperature (Average)	3.4°C (37.4°F)
CCIG Temperature	104.7°K (-267.7°F)

ALSEP DAILY SCIENCE REPORT
December 10, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

The ALSEP central station and all experiments continue to function normally, with scientific data being transmitted continuously from the seismometer, the magnetometer and the field particle experiment sensors. The scientific sensors continue to indicate a very low level of activity in the lunar night environment.

Central station telemetry indicates that the average thermal plate temperature remains stabilized at 22 degrees F, having established thermal equilibrium, December 6, some nineteen hours after DSS Heater 1 was commanded ON. Power provided by the thermoelectric generator remains steady at 74 watts.

The signal received from ALSEP is reported by the remoted sites at -139 to -141 dbm, depending on the site. During the past 24 hours, 9 commands were transmitted to the system for various experiment adjustments. Total commands transmitted to date is 853.

Calibration status of the PSE changed and LSM executed another successful flip calibration sequence at 18:57 CST on 9 December, indicating arrival of the 41st 12-hour timer pulse. The 42nd occurred at 07:00 CST, 10 December.

The Passive Seismic Experiment continues to operate normally, with releveling of the sensors executed as required. No significant seismic activity has been detected by the instrument since the last reporting period.

The Lunar Surface Magnetometer to date has successfully executed 53 flip calibration sequences, and the instrument sensor temperatures remain stabilized at 35 degrees C. No unusual magnetic field measurements have been reported during this period, as the instrument continues to operate satisfactorily.

The Solar Wind Spectrometer is operating normally at well stabilized temperatures. Solar wind activity remains below the instrument threshold.

The Suprathermal Ion Detector continues to operate in full functional mode with Channeltron high voltage ON. SIDE housekeeping telemetry indicates that the various temperature measurements associated with the instrument remain stabilized. Cold Cathode Gauge high voltage turn ON was attempted at 16:42 CST and 16:47 CST on 9 December and was unsuccessful. The only method of turn ON attempted was by the normal sequence of commands (104, 106, 107, 110). CCIG temperature remains stabilized at 104.7 degrees K.

Status at 07:00 CST was as follows:

Sun Angle	261°
Input Power	73.98 watts
Reserve Power	15.17 watts
Heater and Power Dumps	10 watt ON (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.4°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.4°C (95.0°F)
SWS Sensor Temperature	-134.3°C(-209.7°F)
SIDE Temperature (Average)	3.4°C (37.4°F)
CCIG Temperature	104.7°K (-267.7°F)

ALSEP DAILY SCIENCE REPORT
December 11, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

ALSEP 1 continues normal operation 190 hours into lunar night. Lunar midnight occurred at 20:03 CST, 10 December. Lunar Sunrise is predicted to occur at 05:38 CST, 18 December.

Telemetry from the Central Station indicates the average thermal plate temperature is stabilized at 22°F. The RTG input power is steady at 73.98 watts. Signal strength of the downlink telemetry remains steady at about -140 dbm. Minor fluctuations in the signal strength occur depending on the characteristics of the remoted site supporting ALSEP. The 12-hour timer continues to function as predicted, with the 43rd timer pulse occurring at 18:59 CST on 10 December, and the 44th pulse at 06:54 CST, 11 December. A total of 19 commands have been transmitted to the ALSEP during the past 24 hours. The total number of commands sent to date is 872.

Considerable seismic activity was detected by the PSE long period X, Y, and Z sensors at 15:30 CST, 10 December, lasting approximately 30 minutes.

All experiments continue to function well within expected operational engineering levels, with scientific sensors indicating a low level activity.

Status at 07:00 CST was as follows:

Sun Angle	274°
Input Power	73.98 watts
Reserve Power	14.90 watts
Heater and Power Dumps	10 watt ON (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.1°F
PSE Sensor Assembly Temperature	OFF Scale LOW
LSM Sensor Temperature (Average)	34.9°C (94.8°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SIDE Temperatures	3.4°C (37.4°F)
CCIG Temperature	102.9°K (-274.0°F)

ALSEP DAILY SCIENCE REPORT
December 12, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

The ALSEP 1 system continues transmitting scientific and engineering data to Earth more than 550 hours after placement on the lunar surface, with the instruments at thermal equilibrium in the lunar night evnironment.

The central station is operating satisfactorily in the lunar night environment, as the average thermal plate temperature remains stabilized at 22 degrees F. The RTG output continues steady at 73.98 watts. Downlink signal strength remains steady at -140 dbm. The expected effects of the 45th 12-hour timer pulse was seen in the telemetry at 18:57 CST on 11 December. The 46th pulse arrived at 06:54 CST, 12 December. A total of 68 commands have been transmitted to ALSEP over the past 24 hours.

The Lunar Surface Magnetometer science output of the X, Y, and Z axes field sensors dropped off scale unexpectedly at 14:38 CST, 11 December. LSM housekeeping telemetry indicated that the experiment was functionally operational, and that the various temperature measurements associated with the instrument remained stabilized. A series of command sequences were transmitted to the LSM in an effort to restore the field sensor outputs, including reinitialization by commanding the experiment to Standby and back ON, all of which proved to be unsuccessful. The command sequence further verified housekeeping telemetry indicating functional operation of the instrument.

During the 58th flip cal sequence, initiated by the central station timer, indications of valid X axis field sensor output were observed. A second sequence of commands were initiated to the instrument at 18:34 CST, which resulted in restoring the X axis field sensor output. The command sequence proved to be unsuccessful in restoring the science output of the Y axis and Z axis field sensors. Further attempts will be made to restore the science output of these sensors.

All other experiments continue to function within expected operational levels, with the scientific sensors continuing to indicate a very low level of seismic and field particle activity.

Status at 07:00 CST was as follows:

Sun Angle	288°
Input Power	73.98 watts
Reserve Power	15.44 watts
Heater and Power Dumps	10 watt (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.4°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.2°C (95.0°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SWS Module 300 Temperature	-15.6°C (4.1°F)
SIDE Temperature (Average)	3.2°C (37.4°F)
CCIG Temperature	102.9°F (-274.0°F)

ALSEP DAILY SCIENCE REPORT

December 13, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

The ALSEP 1 system continues to transmit scientific and engineering data to earth with thermal equilibrium of the instruments being maintained in the lunar night environment.

The central station continues to operate satisfactorily; the average thermal plate temperature remaining stabilized at 22 degrees F. The RTG output continues steady at 74 watts. Downlink signal strength remains steady at -140 dbm. The expected effect of the 47th and 48th 12-hour timer pulses were observed respectively at 13:57 CST on 12 December and at 06:54 CST on 13 December. A total of 37 commands have been transmitted to ALSEP during the past 24 hours, bringing the cumulative total to 996.

The Lunar Surface Magnetometer scientific outputs of the Y and Z axes field sensors remain off scale despite efforts to restore them by a series of commands. The X axis output has continued uninterrupted since being restored successfully on 11 December, approximately four hours after all three axes outputs unexpectedly dropped off scale. Further efforts to restore the Y and Z axes outputs are anticipated. The Lunar Surface Magnetometer to date has successfully executed 65 flip calibration sequences. The X axis sensor has not indicated any significant magnetic field measurements since its output was restored.

The Passive Seismic Experiment continues to operate normally, with releveling of the sensors being accomplished as required. The PSE detected seismic activity on all three long-period axes at 01:21 CST on 13 December lasting approximately 50 minutes.

The Solar Wind Spectrometer is operating normally and has recorded no significant activity.

The Suprathermal Ion Detector continues to operate in full functional mode with Channeltron high voltage ON. No significant scientific activity is indicated. Cold Cathode Gauge high voltage turn ON was attempted on 12 December with unsuccessful results, the only method of turn ON attempted was by the normal sequence of commands.

Status at 07:00 CST was as follows:

Sun Angle	300°
Input Power	74 watts
Reserve Power	15.44 watts
Heater and Power Dumps	10 watts (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.1°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.4°C (95.8°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SWS Module 300 Temperature	-15.6°C (4.1°F)
SIDE Temperature (Average)	3.3°C (37.9°F)
CCIG Temperature	101.3°K (-277.0°F)

ALSEP DAILY SCIENCE REPORT
December 14, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

The ALSEP 1 system continues to transmit scientific and engineering data to Earth; the instruments maintaining thermal equilibrium in the lunar night environment.

The central station continues to operate satisfactorily in the lunar night environment; the average thermal plate temperature is stabilized around 22 degrees F, occassionally dropping a fraction of a degree below this figure. The RTG output continues steady at 74 watts. Downlink signal strength remains steady at -140 dbm. The expected effects of the 49th and 50th 12-hour timer pulses were observed respectively at 18:57 CST on 13 December and 06:54 CST on 14 December. The effects of the 51st and 52nd 12-hour timer pulses were observed respectively at 18:57 CST on 14 December and 06:54 CST on 15 December. A total of 13 commands have been transmitted to ALSEP over the past 48 hours. This brings the cumulative total to 1011.

The Lunar Surface Magnetometer Y and Z axes science outputs are still off scale. No attempt has been made to restore these outputs in the last 48 hours. The X axis continues to output scientific data since being restored. No significant field intensities have been indicated in this axis. The LSM average sensor temperature is 35.4°C. To date the LSM has successfully executed 59 flip calibration sequences.

The Solar Wind Spectrometer is operating normally at well stabilized temperatures. No significant activity has been recorded in the last 48 hours.

The Passive Seismic Experiment continues normal operation and no significant seismic activity has been observed within the past 48 hours. Releveling is accomplished as required.

The Suprathermal Ion Detector continues to operate in full functional mode with Channeltron high voltage ON. The various temperature measurements associated with the instrument remain stabilized. The Cold Cathode Gauge Experiment high voltage remains OFF and no attempt has been made to turn it on in the past 48 hours. CCIG temperature remains relatively stable, having decreased slightly in the past few days to its present value of 101.3°K

Status at 07:00 CST was as follows:

Sun Angle	325°
Input Power	73.98 watts
Reserve Power	15.17 watts
Heater and Power Dumps	10 watt (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.1°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.4°C (95.7°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SWS Module 300 Temperature	-15.6°C (4.1°F)
SIDE Temperature (Average)	3.4°C (38.1°F)
CCIG Temperature	101.3°K (-277.0°F)

ALSEP DAILY SCIENCE REPORT

December 16, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

ALSEP 1 continues to transmit scientific and engineering data to Earth. The system remains thermally stabilized in the lunar night environment as the site approaches lunar sunrise.

The central station continues to operate satisfactorily with the average thermal plate temperature stabilized at 21.8 degrees F. RTG output continues steady at 74 watts. Downlink signal strength remains steady at -140 dbm. As anticipated, the 53rd 12-hour timer pulse occurred at 18:57 CST on 15 December and the 54th at 06:54 CST on 16 December. All expected effects were normal. A total of 18 commands were transmitted in the past 24 hours bringing the total number of commands transmitted to date to 1029.

The Lunar Surface Magnetometer Y and Z axis science outputs remain off scale. The X axis continues to output scientific data. No significant field intensities have been measured in this axis since the last reporting period. A series of commands was sent in an attempt to restore the Y and Z axis outputs. The series consisted of gain change commands and flip cal commands but restoration of the scientific outputs in these axes was unsuccessful.

The Passive Seismic Experiment continues normal operation and substantial seismic activity was recorded in all three long-period axes for approximately 30 minutes beginning at 1827 CST on 15 December.

The Solar Wind Spectrometer is operating normally and no significant activity has been recorded since the last reporting period.

The Suprathermal Ion Detector continues to operate in full functional mode with no significant ion presence indicated. The Cold Cathode Gauge Experiment high voltage remains OFF and no attempt has been made to turn it ON since the last reporting period.

Status at 07:00 CST was as follows:

Sun Angle	337°
Input Power	73.98 watts
Reserve Power	19.53 watts
Heater and Power Dumps	10 watt (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	21.8°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	34.9°C (94.8°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SWS Module 300 Temperature	-15.6°C (4.1°F)
SIDE Temperature (Average)	3.1°C (37.6°F)
CCIG Temperature	101.3°K (-277.0°F)

ALSEP DAILY SCIENCE REPORT
December 17, 1969

Apollo Lunar Surface Experiments Package Status - 08:00 CST

The ALSEP 1 system continues to transmit scientific and engineering data to earth, with thermal stabilization of the instruments continuing in the lunar night environment.

The central station continues to operate satisfactorily with the average thermal plate temperature stabilized at 21.8 degrees F. RTG output continues steady at 74 watts. Downlink signal strength remains steady at -140 dbm. The expected effects of the 55th and 56th 12-hour timer pulses were observed respectively at 18:57 CST on 16 December and at 06:54 on 17 December. A total of 47 commands have been transmitted to ALSEP during the past 24 hours.

The Lunar Surface Magnetometer science output of the Y axis and Z axis field sensors remains off scale, despite efforts to restore the science output by a series of commands. The X axis scientific data output continues uninterrupted since being restored successfully on 11 December.

The Passive Seismic Experiment continues normal operation with releveling of the sensors being accomplished as required. No significant seismic activity has been observed within the last 24 hours.

The Solar Wind Spectrometer continues operating normally.

The Suprathermal Ion Detector continues to operate in full functional mode with Channeltron high voltage ON. No significant scientific activity is indicated. Attempts to turn ON the Cold Cathode Gauge Experiment high voltage by command sequence proved to be unsuccessful.

Status at 07:00 CST was as follows:

Sun Angle	346°
Input Power	73.98 watts
Reserve Power	15.44 watts
Heater and Power Dumps	10 watts (DSS 1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	21.8°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	35.7°C (95.9°F)
LSM Internal Temperature	-29.8°C (-21.1°F)
SWS Sensor Temperature	-134.3°C (-209.7°F)
SWS Module 300 Temperature	-15.6°C (4.1°F)
SIDE Temperature (Average)	3.2°C (37.8°F)
CCIG Temperature	99.8°K (-280°F)

ALSEP DAILY SCIENCE REPORT
December 18, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP 1 is now 3 hours into its second lunar day and continues to operate normally, having successfully operated throughout one lunation. The optical terminator occurred at approximately 05:18 CST, 18 December, within minutes of the predicted time.

The central station operated satisfactorily throughout the lunar night environment, with the average thermal plate temperature stabilized at approximately 22 degrees F. C/S housekeeping telemetry indicates that the component temperatures and the average thermal plate temperature are increasing at a rate of approximately 2.0 degrees F per hour, with sun angle increase. RTG output power is steady at 73 watts following slight fluctuations noted on C/S telemetry during lunar sunrise. The downlink signal strength remains steady at -140 dbm, with fluctuations of plus or minus one dbm being reported. The effects of the 57th 12-hour timer pulse was seen in the telemetry at 18:56 CST on 17 December. The 58th pulse arrived at 06:54 CST, 18 December. A total of 6 commands were addressed to the command decoder from Mission Control Center during the past 24 hours.

The Passive Seismic Experiment detected seismic activity on the X axis and Y axis long-period horizontal sensors and minor activity on the Z axis long-period vertical sensor lasting two hours and coinciding with terminator crossing. The PSE sensor temperature measurement remains off scale LOW. Last releveling of a long-period sensor occurred 57 hours ago, as all axes of the instrument remained centered throughout the terminator crossing.

The Lunar Surface Magnetometer continues to operate, measuring magnetic field activity on the X axis field sensor. The science output of the Y axis and Z axis field sensors remain off scale LOW and HIGH, respectively. To date 79 flip calibration sequences have been successfully executed by the instrument. LSM housekeeping telemetry indicates that the instrument electronics temperature and sensor temperatures are maintaining thermal equilibrium.

The Solar Wind Spectrometer continues to operate normally with very limited fluctuations of scientific data in the proton levels noted approximately two hours prior to terminator crossing. The sensor assembly temperature is increasing at a rate of approximately 24.0 degrees C per hour.

The Suprathermal Ion Detector continues to operate successfully, measuring particle counts in the high energy range. At 05:25 CST the SIDE solar cell measurement (DI-12) indicated activity, giving another indication of lunar sunrise. The various instrument temperatures are increasing at an average rate of 1.0 degrees C per hour. Cold Cathode Gauge high voltage turn ON was attempted on 17 December with unsuccessful results, the only method of turn ON attempted was by the normal sequence of commands. The CCIG temperature is increasing at a rate of 18.0 degrees K per hour.

The Dust Detector west facing cell changed from off scale LOW to -0.6 ma at 05:18 CST, also giving an indication of lunar sunrise. The west facing cell output and the top cell output changed from off scale LOW at 05:33 CST and 05:37 CST, respectively.

Status at 07:00 CST was as follows:

Sun Angle	1°
Input Power	72.89 watts
Reserve Power	14.08 watts
Heater and Power Dumps	10 watt (DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	24.2°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	34.9°C (94.1°F)
LSM Internal Temperature	-29.7°C (-85.4°F)
SWS Sensor Temperature	-107.7°C (-224.4°F)
SWS Module 300 Temperature	-14.8°C (-58.4°F)
SIDE Temperature (Average)	39.9°C (104.2°F)
CCIG Temperature	121.0° K (-241.6°F)

ALSEP DAILY SCIENCE REPORT
December 19, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP 1 system continues transmitting scientific and engineering data to Earth more than 720 hours after placement on the lunar surface by the crew of Apollo 12.

Central station performance remains nominal; all of the temperatures are rising due to lunar sun rise 96 hours ago. Central station telemetry indicates that the data subsystem component temperatures and the external structural temperatures continue to increase at a rate of approximately 1.2 degrees F per hour. The average thermal plate temperature indicates an increase of 1.2° degrees F per hour. The central station DSS Heater 1 (10 watt) was commanded OFF at 13:06 CST, 18 December, when the average thermal plate temperature reached 41.0 degrees F. Immediately following DSS Heater 1 OFF the average thermal plate temperature decreased steadily, leveling off at 38.4 degrees F. The RTG output continues steady at 74 watts. Housekeeping telemetry indicates that the hot frame temperature is increasing at a rate of 1.7 degrees F per hour.

The downlink signal strength remains steady at -139 dbm, plus or minus one dbm depending upon which remoted site is supporting. During the past 24 hours, a total of 75 commands were transmitted to the command decoder for various experiment adjustments. Total commands transmitted to date is 1146. Calibration status of the PSE changed at 18:56 CST on December 18, indicating the 59th 12-hour timer pulse. The 60th pulse arrived at 06:54 CST, 19 December.

No significant seismic activity has been recorded by the Passive Seismic Experiment since the last reporting period. The PSE sensor temperature (DL-07) remains Off scale low. The last recentering of the long period components occurred at 07:00 CST, 19 December which was the fourth recentering sequence since terminator crossing.

The Lunar Surface Magnetometer is operating satisfactorily as the science output of the Y axis and Z axis field sensors returned to on-scale operation at 15:29 CST, 18 December. The output of the three axis field sensors is now measuring magnetic field activity. LSM data indicated that the Moon moved through the Earth's magnetic bow shock at 19:00 CST, 18 December. The science output of the X, Y, and Z axes field sensors dropped off-scale when the instruments internal temperature was -26.3° degrees C, and returned to on-scale operation when a temperature of -5.1 degrees C was observed. A flip calibration sequence is to be commanded every six hours after each 12-hour timer pulse, which also initiates a flip calibration sequence. To date the LSM has successfully executed 81 flip cal sequences.

The Solar Wind Spectrometer continues to operate normally with some fluctuations in the scientific data noted. Solar Wind Spectrometer engineering data indicates that the electronics temperatures are increasing at a rate of 1.0 degrees C per hour. The sensor assembly temperature is increasing at a rate of 6.0 degrees C per hour.

The Suprathermal Ion Detector continues to operate successfully, measuring high and low energy particle counts. The various instrument temperatures are increasing at a rate of 4.9 degrees C per hour. Cold Cathode Gauge high voltage turn ON was not attempted during lunar sunrise. The CCIG temperature is increasing at a rate of 8.6 degrees K per hour.

The Dust Detector data continues to increase, with East cell (AX-06) and top cell (AX-05) outputs tracking below previously recorded data of the ALSEP first lunar day by approximately 5 MV. The West facing cell (AX-04) remains at a minimum valve, slightly below the previously recorded data.

Status at 07:00 CST was as follows:

Sun Angle	13°
Input Power	73.59 watts
Reserve Power	34.87 watts
Heater and Power Dumps	ALL OFF
Experiment Status	ALL ON
Thermal Plate Temperature (Average)	48.3°F
PSE Sensor Assembly Temperature	OFF Scale LOW
LSM Sensor Temperature (Average)	31.7° C (89.1°F)
LSM Internal Temperature	20.7° C (69.3°F)
SWS Sensor Temperature	13.9° C (57.0°F)
SWS Module 300 Temperature	28.4° C (83.1°F)
SIDE Temperature (Average)	25.8° C (78.4°F)
CCIG Temperature	280.8° K (46.0°F)

ALSEP DAILY SCIENCE REPORT
December 22, 1969

Apollo Lunar Surface Experiments Package Status Report - 09:00 CST

ALSEP 1 enters its 34th earth day of continuous operation; lunar sunrise having occurred for the ALSEP 1 site four earth days ago. The system continues to transmit scientific and engineering data to earth; the downlink signal strength remaining steady at -139 dbm, plus or minus one dbm.

The central station performance remains normal with all temperatures continuing to rise, as expected, due to the steadily increasing sun angle. The average thermal plate temperature rate of increase has fallen to less than 0.4°F per hour. As of 07:00 CST today, the average thermal plate temperature stands at 87.7°F. The RTG power source output is extremely stable at 74 watts. The hot frame temperature rate of increase has slowed substantially and the temperature of hot frame (AR-01) is now 1146°F. During the past 48 hours, a total of 92 commands were transmitted and implemented by ALSEP. The cumulative total of transmitted commands is now 1318.

The last four 12-hour pulses from the timer have provided the following sequence of operational mode changes:

Date	Pulse No.	PSE SP CAL	Status Cage	Time	LSM No.	Flip/CAL Time	C/S Avg. Temp.
21 Dec	63	Change	Change	19:00 CST	87	19:04 CST	76.0°F
21 Dec	64	Change	Change	06:57 CST	88	-	81.0°F
22 Dec	65	Change	Change	19:28 CST	94	19:33 CST	85.3°F
22 Dec	66	Change	Change	08:49 CST	99	08:51 CST	88.2°F

The Passive Seismic Experiment has detected no significant activity within the last 48 hours. The PSE level of seismic activity associated with terminator crossing has subsided and the general level of activity is very low. The PSE sensor temperature increase has slowed substantially and has held between 125°F and 127°F for the past 48 hours, with a slight increasing trend during this period. Releveling of the sensors is required less and less frequently.

The Lunar Surface Magnetometer continues its satisfactory performance; indicating varying magnetic fields as the moon continued its path through the Earth's magnetic bow shock. Current indications are that the moon has entered the relatively stable magnetic region known as the magnetopause. The LSM has had an unexpected

egative 100 gamma deflection in the Y axis field sensor output only, occurring at 02:11 CST, 22 December. The deflection is instrumental, and with the use of the Y axis field offsets and a commanding sequence during flip calibrate sequences, it will be possible to use the Y axis field sensor output.

LSM temperatures at 02:11 CST, 22 December,were as follows:

LSM-X	50.5°C
LSM-Y	47.3°C
LSM-Z	36.9°C
LSM - Internal	59.4°C (138.9°F)
LSM Sensor Temperature (Average)	44.9°C (112.8°F)

The axes sensor temperatures continue to rise as expected. Internal instrument temperature is 62.6°C.

The Solar Wind Spectrometer continues satisfactory operation. The degree of activity indicated is light. The electronics temperature, module 300, and the sensor temperature continue to increase at a rate of 0.4°C per hour.

On 20 December, the Channeltron negative 3.5 KV high voltage within the Suprathermal Ion Detector unexpectedly went OFF at 13:16 CST and at the same time the experiment went from NORMAL MODE to the X10 MODE. The X10 MODE was commanded FF and the high voltage commanded ON. Approximately two hours later the SIDE again went into the X10 MODE unexpectedly. Again the X10 MODE was commanded OFF. Several hours later the X10 MODE was commanded ON and approximately two hours later the SIDE unexpectedly went into NORMAL MODE. The decision was made to command the Channeltron high voltage OFF and this was done at 20:37 CST on 20 December. SIDE temperatures are nominal and rising as expected. The Cold Cathode Gauge Experiment status is unchanged since the last reporting period with the exception of slightly high temperatures as expected.

SIDE temperatures at 13:16 CST, 20 December were as follows:

SIDE - 2	50.9°C
SIDE - 3	49.2°C
SIDE - 4	51.2°C
SIDE - 5	52.7°C
SIDE - 6	52.0°C
SIDE Temperature (Average)	51.2°C (124.2°F)

The Dust Detector east, west, and top facing cell outputs continue tracking previously recorded data of the ALSEP 1 first lunar day at the same sun angle.

Status at 07:00 CST was as follows:

Sun Angle	48°
Input Power	73.59 watts
Reserve Power	37.03 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	87.7°F
PSE Sensor Assembly Temperature	126.9°F
LSM Sensor Temperature (Average)	49.2°C (120.6°F)
LSM Internal Temperature	62.6°C (146.7°F)
SWS Sensor Temperature	48.7°C (119.9°F)
SWS Internal Temperature Module 300	60.9°C (141.6°F)
SIDE Temperature (Average)	67.2°C (153.0°F)
CCIG Temperature	347.4°F (165.9°F)

ALSEP DAILY SCIENCE REPORT
December 23, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

Thirty-four days after placement on the lunar surface by the Apollo 12 crew ALSEP continues to function normally, with scientific data being transmitted to Earth continuously, including the effects of the moon from the geomagnetic tail into the magnetopause.

Central station performance continues to remain exceptionally stable, with the RTG power output remaining constant at 73.59 watts. Downlink signal strength continues steady at -139 dbm, with fluctuations of plus or minus one db. A total of 45 commands were addressed to the command decoder from Mission Control Center for various experiment adjustments during the past 24 hours. The average thermal plate temperature continues to increase at 0.2 degrees F per hour, with a value of 92.3 degrees F at 07:00 CST. The effects of the 67th 12-hour timer pulse were seen in the telemetry at 05:29 CST on 23 December. The 68th timer pulse did not occur as expected at 06:57 CST.

No significant seismic activity has been recorded by the Passive Seismic Experiment since the last reporting period. The temperature of the PSE sensor assembly continues to gradually increase at a rate of 0.4 degrees F per hour. Periodic recentering of the long-period components is required approximately every 12 hours, as all axes of the sensor have stabilized.

The Lunar Surface Magnetometer remains in the geomagnetic tail measuring a time invariant magnetic field in both magnitude and direction. The average axis sensor temperatures and the internal instrument temperature continue to increase at about 0.5 degrees C and 0.4 degrees C, respectively. To date the LSM has successfully executed 102 flip cal sequences.

The Solar Wind Spectrometer continues to operate nominally with no significant change in scientific data noted as the moon approaches the magnetopause boundary of the earth. SWS engineering data reflects that the electronics temperatures are increasing at less than 0.1 degrees C per hour, with the sensor temperature increasing at 0.3 degrees C per hour.

The Suprathermal Ion Detector continues to operate with the Channeltron high voltage supply commanded OFF. The Cold Cathode Ion Gauge is also continuing to operate with the 4500-volt power supply OFF. The SIDE temperatures continue to increase at a rate of 0.2 degrees C per hour, while the CCIG temperature has increased 8.2 degrees K since the last reporting period.

The Dust Detector cell outputs continue to track previously recorded data, with the east and west cell outputs varying high and low respectively from previously recorded data.

Status at 08:00 was as follows:

Sun Angle	60°
Input Power	73.59 watts
Reserve Power	37.03 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	92.3°F
PSE Sensor Assembly Temperature	127.4°F
LSM Sensor Temperature (Average)	60.8°C (141.4°F)
LSM Internal Temperature	71.4°C (160.5°F)
SWS Sensor Temperature	55.9°C (132.6°F)
SWS Internal Temperature Module 300	62.9°C (145.2°F)
SIDE Temperature (Average)	72.9°C (163.2°F)
CCIG Temperature	355.6°K (180.7°F)

ALSEP DAILY SCIENCE REPORT
December 24, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP 1 is now 140 hours into its second lunar day with the equipments continuing to operate normally and scientific data being transmitted continuously to Earth. Real time support of ALSEP 1 will be terminated starting at 19:30 CST, 24 December until 06:30 CST, 26 December.

The central station continues to operate satisfactorily with its temperature sensors recording no increase within the past seven hours, indicating that the C/S is approaching thermal equilibrium as we draw near to lunar noon. The average thermal plate temperature as of 08:00 CST was 94.5°F. The RTG output remains steady at 74 watts. The signal received from ALSEP is reported by the remoted sites at -136 to -140 dbm, depending on the site. A total of 31 commands were transmitted to the command decoder in the past 24 hours, bringing the total number of commands transmitted and implemented to date by ALSEP to 1394. The 68th 12-hour timer pulse occurred during the regularly scheduled computer maintenance down time between 00:01 CST - 02:17 CST, 24 December. The effects of the 68th timer pulse were observed in the PSE housekeeping status.

The Passive Seismic Experiment continues normal operation, with recentering of the sensors executed as required. The PSE temperature sensor continues to increase at a very slight rate of 0.1°F per hour. No significant seismic activity has been detected by the instrument in the past 24 hours.

The Lunar Surface Magnetometer has successfully executed 109 flip calibration sequences and is operating successfully, indicating varying magnetic fields as the moon continues its path through the Earth's geomagnetic tail. The axis sensor temperatures(average) continues to increase at about 0.2°C per hour, as does the instruments internal temperature.

The Solar Wind Spectrometer operation is normal. The internal electronics temperature has been stabilized at 63.5°C over the past 19 hours. The sensor temperature has stabilized at 59.7°C since 11:00 CST, 23 December.

The Suprathermal Ion Detector and Cold Cathode Gauge continue operating with their high voltages commanded OFF. No attempt has been made since the last reporting period to turn ON the -3.5KV Channeltron high voltage supply or the CCIG 4.5KV high voltage supply. The CCIG temperature has been stabilized at 364.0°K since 08:00 CST, 23 December. SIDE temperatures are normal and increasing as expected.

The Dust Detector cell outputs continue to track closely the previously recorded data of the ALSEP 1 first lunar day.

Status at 08:00 CST was as follows:

Sun Angle	72°
Input Power	73.59 watts
Reserve Power	36.76 watts
Heater and Power Dumps	All OFF
Experiment status	All ON
Thermal Plate Temperature(Average)	94.5°F
PSE Sensor Assembly Temperature	130.4°F
LSM Sensor Temperature (Average)	69.6°C (157.3°F)
LSM Internal Temperature	77.3°C (171.1°F)
SWS Sensor Temperature	59.7°C (139.5°F)
SWS Internal Temperature Module 300	63.5°C (146.3°F)
SIDE Temperature (Average)	76.1°C (169.0°F)
CCIG Temperature	372.6°K (211.3°F)

ALSEP DAILY SCIENCE REPORT
December 25/26, 1969

Apollo Lunar Surface Experiments Package Status Report - 09:00 CST

Real time support of ALSEP 1 was suspended at 19:25 CST, 24 December and resumed at 07:30 CST, 26 December. The package is now 189 hours into its second lunar day, lunar noon having occurred theoretically at 14:47 CST, 25 December. All scientific and engineering data was recorded at the remoted sites during the real time support suspension.

Current data indicates that the central station continues to function normally. The temperature sensors indicate that no appreciable change has occurred within the past 49 hours. The average thermal plate temperature remains steady at 96.1°F. Output power from the RTG remains constant at 74 watts. The signal strength of the downlink telemetry of ALSEP is -140 dbm with minor fluctuations depending on site characteristics. During the past 49 hours, a total of 39 commands were transmitted to the package for PSE and LSM functions. The total number of commands transmitted to date is 1433. The 69th 12-hour timer pulse occurred at 15:53 CST, 24 December, when the normal effects of the timer pulse were observed in the housekeeping telemetry. It has not been confirmed as to whether any timer pulses occurred during real time support suspension. A 12-hour timer pulse did occur, with normal effects, at 08:25 CST, 26 December. This pulse will be referred to as the 70th timer pulse.

No significant seismic activity was detected by the Passive Seismic Experiment during real time support since the last reporting period. The PSE temperature sensor indicates an increase of 8.8°F during the past 49 hours. The axes have essentially stabilized and recentering of the long period components was not required at resumption of real time support. Recentering was last accomplished just prior to real time support suspension.

The Lunar Surface Magnetometer has successfully executed at least 113 flip calibration sequences. It has not been determined whether or not other sequences were executed in conjunction with any 12-hour timer pulse which may have occurred during real time support suspension. The LSM sensors indicate a time invariant magnetic field in both magnitude and direction. The average axis sensor temperature and the internal instrument temperature have increased 4.2°C and 2.0°C, respectively, since the last reporting period.

The Solar Wind Spectrometer continues to operate normally. No significant change in scientific data is noted at this time. The engineering data of the SWS indicates an increase of 0.8°C of the electronics temperature and an increase of 4.0°C of the sensor temperature since the last reporting period.

At resumption of real time support it was observed that the Suprathermal Ion Detector Experiment's high energy particle counter calibration sequence had disappeared unexpectedly. The SIDE continues to operate with the Channeltron high voltage commanded OFF. The SIDE temperature measurements have decreased at an average of 1.0°C over the past 49 hours. The Cold Cathode Gauge high voltage supply remains OFF, with the gauge temperature stabilized at 372.6°K. No attempt has been made to command either high voltage supply back ON since the last reporting period.

Whe real time support was resumed, the Dust Detector cell outputs continued to track previously recorded data as they have up until support was suspended.

Status at 08:00 CST was as follows:

Sun Angle	97°
Input Power	73.59 watts
Reserve Power	36.49 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	96.1°F
PSE Sensor Assembly Temperature	139.2°F
LSM Sensor Temperature (Average)	73.8°C(164.8°F)
LSM Internal Temperature	79.3°C(174.9°F)
SWS Sensor Temperature	63.7°C(146.7°F)
SWS Internal Temperature Module 300	64.3°C(147.9°F)
SIDE Temperature (Average)	75.1°C(167.2°F)
CCIG Temperature	372.6°K(211.3°F)

ALSEP DAILY SCIENCE REPORT
December 27, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP 1 placed on the lunar surface by the Apollo 12 crew is now in its 38th day of continuous operations, with the equipments functioning normally transmitting scientific and engingeering data to Earth.

Central station performance is normal, with RTG power output constant at 73.6 watts. C/S thermal plate temperature sensors indicated a very slight increase of 0.04°F per hour over the past 24 hours. The average thermal plate temperature as of 08:00 CST was 97.2°F. Downlink signal strength remains steady at -140 dbm. The 71st 12-hour timer pulse occurred at 20:41 CST on 26 December, with the effects of the pulse being observed in the housekeeping status. Since the last reporting period a total of 17 commands were addressed to ALSEP 1.

The Passive Seismic Experiment continues to operate satisfactorily. No significant seismic activity was observed during the past 24 hours. The PSE temperature sensor continues its slow rate of increase of 0.1°F per hour.

The Lunar Surface Magnetometer continues to operate normally. The three axis field sensors detected magnetic field intensities of relatively strong magnitude with abrupt variations possibly surpassing previous levels recorded. This phenomenon is the indication of the lunar path through the transition region from the magnetopause region to the bow shock region. LSM housekeeping telemetry indicates that the instruments internal electronics temperature and the average sensor temperature started to decrease at 17:00 CST, 26 December, at a rate of approximately 0.1°C per hour.

The Solar Wind Spectrometer continues to operate with no signifincant activity in data being noted. The internal electronics temperature (module 300) and the sensor assembly temperature remain constant.

The Suprathermal Ion Detector and the Cold Cathode Gauge continue to operate normally with their high voltage supplies OFF. SIDE housekeeping telemetry indicates that the various temperature measurements associated with the SIDE continue to fluctuate high and low by approximately 0.8°C per hour. The CCIG temperature remains steady at 372.6°K.

The Dust Detector data indicates that the cell outputs continue to track previously recorded ALSEP 1 data without any significant variations.

Status at 08:00 CST was as follows:

Sun Angle	110°
Input Power	73.59 watts
Reserve Power	36.76 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	97.2°F
PSE Sensor Assembly Temperature	141.0°F
LSM Sensor Temperature (Average)	71.4°C (160.5°F)
LSM Internal Temperature	77.3°C (171.1°F)
SWS Sensor Temperature	59.7°C (139.5°F)
SWS Internal Temperature Module 300	63.5°C (146.2°F)
SIDE Temperature (Average)	76.7°C (170.1°F)
CCIG Temperature	372.6°K (211.3°F)

ALSEP DAILY SCIENCE REPORT
December 28/29, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

The ALSEP central station and all experiments continue to function satisfactorily, with scientific data being transmitted continuously from the seismometer, the magnetometer, and the solar wind spectrometer experiment sensors. Engineering data being transmitted from the central station and all experiments continues to be within the expected operational levels.

Central station operation continues to be extremely stable. Thermal equilibrium of the central station occurred at 06:00 CST, 27 December, when the average thermal plate temperature read 97.2°F. Eleven hours later, at 17:00 CST, 27 December, the average thermal plate temperature started decreasing at a rate of 0.2°F per hour, with a value of 89.5°F at 07:00 CST, 29 December. The RTG power source output remains steady at 73.6 watts.

The downlink signal strength remains stady at -140 dbm, with fluctuations of plus or minus one dbm depending upon which remoted site is supporting ALSEP. A spurious LSM flip/calibration sequence was executed at 03:14 CST, 28 December, while being supported by the remoted site at Guaymas, Mexico. Examination of the Mission Control command history and the Guaymas command history reveals that the flip calibration cycle command was not transmitted by either station. The mission control command history shows that a command verification word (Octal 131) was received in the downlink at 03/14/06.94 CST, 28 December. Further examination of the data on the analog brush recorders shows valid data during the time period that the 131 CVW was recorded, indicating that the CVW was not a hit on the data transmission line. At the time of the spurious flip/cal sequence the Guaymas carrier was down and modulation OFF.

Since and including December 20, the 12-hour timer pulses have provided the following sequence of operational mode changes.

DATE	Pulse No.	PSE SP CAL	Status Cage	Time	LSM No	Flip/Cal Time	C/S Avg. Temp.
20 Dec. 69	63	Change	Change	19:00 CST	87	19:04 CST	76.0°F
21 Dec. 69	64	Change	Change	06:57 CST	88	-	81.0°F
21 Dec. 69	65	Change	Change	19:28 CST	94	19:33 CST	85.3°F
22 Dec. 69	66	Change	Change	08:49 CST	99	08:51 CST	88.2°F
23 Dec. 69	67	Change	Change	05:30 CST	102	05:33 CST	92.2°F
24 Dec. 69	68	Change	Change	*00:00 CST/ 02:17 CST	109	*00:00 CST/ 02:17 CST	94.5°F
24 Dec. 69	69	Change	Change	15:53 CST	112	16:00 CST	94.5°F

Date	Pulse No.	PSE SP CAL	Status Cage	Time	LSM No.	Flip/Cal Time	C/S Avg. Temp.
4 Dec. 69	19:30 CST	Real time support suspended. No functional changes					
26 Dec. 69	07:30 CST	recorded at MSC. No playback from remoted sites has been requested.					
26 Dec. 69	70	Change	Change	08:21 CST	114	08:29 CST	96.1°F
26 Dec. 69	71	Change	Change	20:41 CST	116	20:47 CST	96.7°F
27 Dec. 69	72	Change	Change	09:11 CST	117	09:19 CST	97.2°F
27 Dec. 69	73	Change	Change	21:14 CST	118	21:19 CST	96.9°F
28 Dec. 69	74	Change	Change	09:11 CST	120	09:19 CST	95.3°F
28 Dec. 69	75	Change	Change	21:14 CST	122	21:19 CST	92.2°F

* During this period, the MSC computer supporting ALSEP was not functioning, thus the exact time that the pulse occurred was not verified. The functional changes were verified when the computer became operational, however.

During the past 48 hours, a total of 42 commands were transmitted and implemented by ALSEP. The cumulative total of transmitted commands is now 1492.

The Passive Seismic Experiment continues to operate satisfactorily, with no significant seismic activity detected since the last reporting. PSE telemetry indicated that the sensor assembly temperature (DL-07) peaked at 142.0°F at 10:00 CST, 28 December. A decrease rate of 0.04°F per hour for the past 19 hours continues, with the sensor assembly having a value of 141.2°F at 06:00 CST. The last releveling of the three long-period sensors was successfully completed 109 hours ago.

The Lunar Surface Magnetometer continues operating successfully with scientific data being transmitted to earth as the moon moves out of the earth's magnetic bow shock region, and into the transition region. The instruments internal electronics temperature and the average sensor temperature continue to decrease at a rate of 0.2°C per hour and 0.3°C per hour, respectively.

The Solar Wind Spectrometer continues to operate with limited fluctuations of scientific data recorded. The sensor assembly temperature and the electronics module 300 temperature continue to decrease at a rate of 0.3°C per hour and 0.1°C per hour, respectively.

The Suprathermal Ion Detector high energy particle counter calibration sequence returned at 10:06 CST, 28 December. The SIDE experiment continues to operate with the Channeltron high voltage supply commanded OFF. The various SIDE temperature measurements have continued to decrease at an average rate of 0.1°C per hour over the past 48 hours. The CCIG calibration sequence became low in amplitude, preceeded by a square wave at 04:30 CST on 29 December unexpectedly. The CCIG continues to operate with the high voltage supply OFF. The gauge temperature is decreasing at a rate of 0.1°K per hour.

Dust Detector data indicates that cell outputs coincide closely to previously recorded data of the first lunar day with no significant variations.

Status at 08:00 CST was as follows:

Sun Angle	134.0°
Input Power	73.59 watts
Reserve Power	36.76 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	89.5°F
PSE Sensor Assembly Temperature	141.2°F
LSM Sensor Temperature (Average)	55.0°C (131.0°F)
LSM Internal Temperature	66.0°C (151.0°F)
SWS Sensor Temperature	45.3°C (113.5°F)
SWS Internal Temperature	59.2°C (138.5°F)
SIDE Temperature (Average)	69.8°C (157.5°F)
CCIG Temperature	364.0°K (195.8°F)

ALSEP DAILY SCIENCE REPORT
December 30, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP 1 has now operated continuously for 41 consecutive days. The deployment site is currently experiencing a sun angle that approximates mid-afternoon of the second lunar day. All experiments remain operational and the central station downlink telemetry signal strength is steady at -140 dbm.

Central Station performance is satisfactory and housekeeping telemetry reveals temperatures are continuing to decline, as expected, due to the decreasing sun angle. The average thermal plate temperature is 79.5°F. The RTG output is constant at 74 watts. A total of 28 commands have been transmitted within the past 24 hours. This brings the cumulative total of commands transmitted, received, and implemented to 1520. On 29 December, at 15:08 CST, DSS-1 (10 watt heater) came on voluntarily. There was no uplink command carrier on at that time and no command verification word was received. The proper sequence of commands was transmitted to turn DSS-1 OFF and this was successfully accomplished. No explanation of this occurrence is presently available. The functional effects of the 76th and 77th 12-hour timer pulses were observed at 09:11 CST and 21:13 CST respectively, on 29 December. The pulses are now occurring at the anticipated 12-hour intervals.

The Passive Seismic Experiment is functioning satisfactorily. The sensor assembly temperature (DL-07) continues to decrease and is now 138.6°F. The Y axis sensor was successfully releveled during the past 24 hour period. The X and Z tidal axes being slightly more stable, do not need releveling at this time. It is expected releveling of all three long-period axes will become more frequent as the terminator draws nearer. No seismic activity has been detected in any axis during the past 24 hours.

The Lunar Surface Magnetometer continues to operate satisfactorily, collecting characteristics of interplanetary magnetic fields. Four LSM flip calibration sequences were successfully performed during the past 24 hours. The number of flip calibrations successfully executed thus far totals 127.

The Solar Wind Experiment continues normal operation. No significant solar wind fluctuations have been detected.

The Suprathermal Ion Detector continues in the OPERATE mode with Channeltron high voltage turned OFF. It is anticipated the high voltage will be commanded back on within a short time.

The Cold Cathode Gauge Experiment continues to operate with high voltage turned OFF. The CCIG temperature is 355.6°K.

The Dust Detector data continues to indicate that the cell outputs are tracking previously recorded ALSEP 1 data with no significant variations.

Status at 07:00 CST was as follows:

Sun Angle	146.0°
Input Power	73.59 watts
Reserve Power	37.58 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	79.5°F
PSE Sensor Assembly Temperature	138.6°F
LSM Sensor Temperature (Average)	41.4°C (106.5°F)
LSM Internal Temperature	56.4°C (133.5°F)
SWS Sensor Temperature	35.7°C (96.3°F)
SWS Internal Temperature	55.0°C (131.0°F)
SIDE Temperature (Average)	63.0°C (145.4°F)
CCIG Temperature	355.6°K (180.7°F)

NOTE: The following correction should be made to the ALSEP DAILY SCIENCE REPORT dated December 28/29, 1969. In the third paragraph, the second sentence should read:

"A spurious LSM flip/calibration sequence was executed at 03:14 CST, 27 December, while being supported by the remoted site at Guaymas, Mexico."

ALSEP DAILY SCIENCE REPORT
December 31, 1969

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

ALSEP 1 contimues to transmit scientific and engineering data to Earth and has now operated without interruption for more than 1000 hours. All experiments are functioning in the OPERATE mode and the downlink telemetry signal strength remains steady at -140 dbm. Real time support of ALSEP 1 will be terminated starting at 19:30 CST, 31 December until 17:00 CST, 1 January.

Central station performance remains satisfactory. The average thermal plate temperature has continued to decline at a rate of 0.6°F per hour over the past 24 hours. Presently the average thermal plate temperature is 66.1°F. The RTG output is constant at 74 watts. A total of 32 commands have been transmitted to ALSEP during the past 24 hours. The 12-hour intervals between timer pulses is being maintained as indicated by the observed effects of pulses number 78 and 79 occurring at 09:09 CST and 21:11 CST on 30 December.

The Passive Seismic Experiment is operating satisfactorily. The sensor assembly temperature (DL-07) is decreasing at an average rate of 0.2°F per hour, and now stands at 134.5°F. The Y axis long period sensor was releveled during the past 24 hours. The X and Z axes long period sensors have not required releveling since 25 December. No significant seismic activity has been apparent during the past 24 hours.

The Lunar Surface Magnetometer continues satisfactory operation and is indicating relatively stable magnetic fields of low intensity, characteristic of the interplanetary space regions. The Y axis field sensor returned to normal at 07:03 CST, 31 December, when the negative 100 gamma deflection in the Y axis sensor disappeared.

LSM temperatures at 07:03 CST, 31 December, were as follows:

LSM - X Axis Sensor	41.7°C
LSM - Y Axis Sensor	33.9°C
LSM - Z Axis Sensor	39.2°C
LSM - Internal	45.8°C
LSM Sensor Temperature (Average)	38.3°C

Seven LSM flip calibration sequences were executed within the past 24 hours. The average sensor temperature is decreasing at a rate of 0.1°C per hour and now stands at 38.3°C. The LSM internal temperature is decreasing at a rate of 0.4°C per hour, with a value of 45.8°C at 07:00 CST.

The Solar Wind Spectrometer is operating normally and has detected no siginficant increase in data. The internal electronics temperature (module 300) is decreasing at an average rate of 0.4°C per hour, while the sensor assembly temperature decreases at a rate of 0.5°C per hour.

The Suprathermal Ion Detector continues in the OPERATE mode with the Channeltron high voltage commanded OFF. The SIDE average temperature is decreasing at the rate of 0.4°C per hour. The Cold Cathode Gauge continues to operate with the high voltage OFF. The CCIG temperature is declining at a rate of 0.3°K per hour.

Dust Detector data continues to track previous data from the first lunar day.

Status at 08:00 CST was as follows:

Sun Angle	158°
Input Power	73.59 watts
Reserve Power	37.85 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	66.1°F
PSE Sensor Assembly Temperature	134.5°F
LSM Sensor Temperature (Average)	38.3°C (100.9°F)
LSM Internal Temperature	45.8°C (114.4°F)
SWS Sensor Assembly Temperature	24.3°C (75.7°F)
SWS Internal Temperature Module 300	46.5°C (115.7°F)
SIDE Temperature (Average)	52.3°C (126.1°F)
CCIG Temperature	347.4°K (165.9°F)

ALSEP DAILY SCIENCE REPORT

January 1/2, 1970

Apollo Lunar Surface Experiments Package Status Report - 08:00 CST

Real time support of ALSEP 1 was suspended at 19:00 CST, 31 December, and resumed at 14:00 CST, 1 January. The package is just under eight hours into its second lunar night, lunar sunset having occurred at 00:20 CST, 2 January. During the time of real time support suspension, all ALSEP scientific and engineering data was recorded at the remoted sites.

Current downlink telemetry indicates that the central station continues to function normally. Structural temperatures continue to decrease. All internal temperatures decreased slowly until 00:55 CST, 2 January, at which time the average thermal plate temperature was 24.6°F and the 10 watt heater, DSS-1, was commanded ON causing a slow rise in the C/S internal temperatures. At this time the average thermal plate temperature is 27°F. The RTG input power remains steady at 74 watts. The downlink signal strength remains constant at -140 dbm, with minor fluctuations occurring as a function of remoted site characteristics. During the past 48 hours, 28 commands have been transmitted and implemented to ALSEP, bringing the cumulative total to date to 1610. The 80th 12-hour timer pulse occurred at 09:08 CST, 31 December. It has not been verified whether any timer pulses occurred during real time support suspension. A 12-hour timer pulse occurred at 21:08 CST, 1 January, producing normal effects. This will be referenced as the 81st pulse.

The Passive Seismic Experiment long-period sensors all indicated a significant seismic event beginning at 20:23 CST 1 January, and lasting approximately 40 minutes. The instrument also recorded an episode of large tilts (both tides and tilts) on the X axis and Y axis long-period horizontal sensors lasting approximately one hour and coinciding with terminator crossing. The PSE temperature sensor indicates a decrease rate of 0.2°F during the past 48 hours. Recentering of the X and Y long-period components is occurring frequently at this time due to the temperature change associated with lunar sunset. The long-period Z axis has not required releveling in approximately eight days. The PSE heater was commanded to Auto ON at 21:39 CST, 1 January.

The Lunar Surface Magnetometer sensors indicate a continuing time invariant magnetic field in both magnitude and direction. The LSM has successfully executed 138 flip/calibration sequences. It has not been determined whether or not other sequences were executed by any 12-hour timer pulses which may have occurred during real time support suspension. The average axis sensor temperature and the internal instrument temperature have decreased at a rate of 0.04°C and 0.7°C, respectively, since the last reporting period.

The Solar Wind Spectrometer continues to function normally and indicates no significant change in scientific data at this time. SWS engineering data indicates that the electronics temperature has decreased at a rate of 0.8°C per hour and the sensor temperature has decreased at a rate of 2.6°C per hour since the last reporting period.

The Suprathermal Ion Detector Experiment's Channeltron high voltage was commanded ON at 14:27 CST, 31 December, when the average temperature was 48.5°C. At this time, considerable high energy data was displayed, but the data has diminished appreciably since then. The SIDE temperatures have decreased at a rate of 0.2°C per hour during the past 48 hours. The Cold Cathode Guage's high energy calibration sequence appears to be returning, starting at approximately 06:00 CST, 2 January. The CCIG high voltage supply remains OFF, as no attempt has been made to command it ON since the last reporting period. The instrument's temperature has decreased at a rate of 3.6°K per hour during the past 48 hours.

The Dust Detector coil output data went OFF scale LOW at lunar sunset, 00:20 CST, 2 January.

Status at 08:00 CST was as follows:

Sun Angle	185°
Input Power	73.98 watts
Reserve Power	21.16 watts
Heater and Power Dump	10 watt (DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	27.1°F
HSE Sensor Assembly Temperature	125.7°F
LSM Sensor Temperature (Average)	35.4°C (95.7°F)
LSM Internal Temperature	8.9°C (48.0°F)
SWS Sensor Temperature	-107.7°C (-161.9°F)
SWS Internal Temperature Module 300	8.2°C (46.8°F)
SIDE Temperature (Average)	53.2°C (127.8°F)
CCIG Temperature	174.7°K (-144.9°F)

ALSEP DAILY SCIENCE REPORT
January 4, 1970

Apollo Lunar Surface Experiments Package Status Report - 09:00 CST

ALSEP 1 placed on the lunar surface by the Apollo 12 crew has now operated 1104 consecutive hours continuously transmitting scientific and engineering data to Earth. Mission Control Center real time support was suspended at 08:55 CST, 4 January, at which time the Manned Space Flight Network shifted to Phase III operations in support of ALSEP 1. Phase III operations require that the network record the ALSEP 1 downlink continuously. Mission Control is scheduled for real time support of ALSEP two hours per day (08:30 - 10:30 CST) starting 5 January.

Engineering data from the central station indicates that it continues to function normally and that all C/S temperatures have essentially stabilized. The average thermal plate temperature is steady at 22°F. Output power from the RTG is constant at 74 watts. There is no change in downlink telemetry signal strength as it remains at an essentially steady -140 dbm. The 84th 12-hour timer pulse occurred at 08:42 CST, 3 January and the 85th 12-hour pulse occurred at 20:42 CST on the same day. The 86th 12-hour timer pulse was observed at 08:38 CST, 4 January. All functional effects associated with the pulses were observed. Since the last reporting period 78 commands have been sent to and successfully implemented in ALSEP. This results in an accumulative total of 1706 commands to date.

The Passive Seismic Experiment X, Y, and Z long-period sensors detected a significant seismic event beginning at 10:25 CST, 3 January, and lasting approximately one hour. The long-period axes were releveled individually at intervals of approximately eight hours since the last reporting period. The PSE sensor assembly temperature is now decreasing at a rate of approximately 0.3°F per hour.

The Lunar Surface Magnetometer science output of the X, Y, and Z axes field sensors dropped off scale suddenly at 18:06 CST, 3 January. LSM housekeeping data indicated that the experiment was functionally operational, and that the various temperature measurements associated with the instrument remain stabilized. A series of command sequences were transmitted to the LSM in an effort to restore the field sensor outputs. The command sequence further verified housekeeping telemetry indicating functional operation of the instrument. To date, 144 flip/calibration sequences have been functionally verified.

The Solar Wind Spectrometer is operating normally and has recorded no significant activity with all temperatures stabilized.

The Suprathermal Ion Detector continues to operate in full functional mode with Channeltron high voltage ON. No significant change in scientific data

has been observed since the last reporting period. The Cold Cathode Gauge high voltage remains OFF. All temperatures have been essentially stabilized over the past 48 hours.

Status as of 08:55 CST, 4 January was as follows:

Sun Angle	209°
Input Power	73.98 watts
Reserve Power	15.72 watts
Heater and Power Dumps	10 watts ON (DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	22.4°F
PSE Sensor Assembly Temperature	115.8°F
LSM Sensor Temperature (Average)	35.2°C (95.4°F)
LSM Internal Temperature	-24.6°C (-12.3°F)
SWS Sensor Assembly Temperature	-131.7°C (-205.1°F)
SWS Internal Temperature Module 300	-14.4°C (6.1°F)
SIDE Temperature (Average)	20.1°C (68.2°F)
CCIG Temperature	112.3°K (-257.2°F)

ALSEP WEEKLY SCIENCE REPORT
January 9, 1970

Apollo Lunar Surface Experiments Package Status Report - 12:00 CST, 9 January

ALSEP-1 continues to transmit scientific and engineering data to Earth after more than 51 days of continuous operation. The system has had no cessation of satisfactory performance since being placed on the lunar surface by the Apollo 12 crew. Phase III operations, remoted site record of the downlink only, continues in effect during the time that real time Mission Control support was not eventuated during the past five days.

Central station telemetry indicates that the average thermal plate temperature remains stabilized at 21°F, having established thermal equilibrium, January 3, some twenty hours after DSS Heater 1 was commanded ON. The RTG output power has not varied and remains at 74 watts. Downlink telemetry strength fluctuates slightly depending on site characteristics, but is normally steady at -140 dbm. At the initiation of each real time support period, a 12-hour timer pulse has been functionally verified as having occurred during the previous twenty-two hours of Phase III operation by verifying its functional effects in the LSM and PSE housekeeping data. A 12-hour timer pulse has also been observed during each real time support period as follows:

Pulse Number	PSE uncage/SP Cal	LSM Flip/Calibration	Date
88	08:42 CST	08:47 CST	5 January
90	08:39 CST	08:39 CST	6 January
92	08:43 CST	08:44 CST	7 January
94	08:38 CST	08:42 CST	8 January
96	08:38 CST	08:41 CST	9 January

In the past 5 days, 79 commands have been transmitted to and successfully implemented by the command decoder, bringing the accumulative total of commands to 1784.

During the 51 days of operation, the Passive Seismic Experiment long-period sensors have detected approximately 25 seismic events of natural origin. These signals all showed prolonged duration (10 minutes to 1 hour). These occurrences are of a nature similar to those detected by PSEP. One releveling sequence of the X, Y, and/or Z axes was necessary once every day for the past week.

The Lunar Surface Magnetometer axes field sensors continue reading off scale, suspending science output. Attempts have been made over the past week to restore the field sensor outputs, but none of these command sequences has been successful. Engineering parameters indicate functional operation of the instrument and that the temperatures remain stabilized. The LSM has successfully executed 160 flip/calibration sequences to date.

The Solar Wind Spectrometer temperatures remain stabilized. No significant change in activity has been indicated as the instrument continues to function normally.

The Suprathermal Ion Detector Experiment is operating successfully with Channeltron high voltage ON. The scientific data is of very low level intensity. No attempt has been made to command the Cold Cathode Gauge high voltage ON since the last reporting period. All temperatures continue to be stabilized.

Status as of 10:00 CST, 9 January was as follows:

Sun Angle	269°
Input Power	73.98 watts
Reserve Power	19.26 watts
Heater and Power Dumps	10 watts ON (DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	21.3°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	34.4°C (93.9°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Assembly Temperature	-134.3°C (-209.7°F)
SWS Internal Temperature Module 300	-15.6°C (3.9°F)
SIDE Temperature (Average)	3.7°C (38.7°F)
CCIG Temperature	103.0°K (-274°F)

ALSEP WEEKLY SCIENCE REPORT
January 16, 1970

Apollo Lunar Surface Experiments Package Status Report - 12:00 CST, 16 January

ALSEP-1 continues to transmit scientific and engineering data to Earth; having operated without interruption for more than 1780 hours. All experiments are functioning in the OPERATE mode and the downlink telemetry signal strength remains steady at -140 dbm. Real time support for the optical terminator crossing will be initiated at 16:00 CST, 16 January and continue for 32 hours. Phase III operations, remoted site record of downlink tlelmetry only, continues in effect when real time support is not actuated.

Engineering data from the central station indicates that it continues to operate normally with the average thermal plate temperature stabilized at 21°F. The RTG output power continues steady at 74 watts. At the initiation of each real time support period, a 12-hour timer pulse has been functionally verified as having occurred during Phase III operations by presence of its functional effects in the LSM and PSE housekeeping data. A 12-hour timer pulse has also been observed during each real time support period as follows:

Pulse Number	PSE uncage/SP Cal.	LSM Flip/Calibration	Date
98	08:38 CST	08:41 CST	10 January
100	08:37 CST	08:41 CST	11 January
102	08:37 CST	08:41 CST	12 January
104	08:37 CST	08:41 CST	13 January
106	08:37 CST	08:40 CST	14 January
108	08:38 CST	08:40 CST	15 January

(No real time support was initiated during the period of expected 12-hour timer pulse arrival on the morning of January 16.)

A total of 10 commands were transmitted to the command decoder in the past seven days, bringing the total number of commands transmitted and implemented to date by ALSEP to 1794.

No significant activity has been detected by the Passive Seismic Experiment since the last reporting period. The instrument continues to function satisfactorily. Three releveling sequences have been required of the X and/or Z axes of the PSE during the past 7 days, as the Y axis remains stable.

Science output from the Lunar Surface Magnetometer continues to be suspended, as all axes field sensors are reading off scale. No attempt has been made to restore the field sensor outputs during the past week. The engineering data in the downlink telemetry indicates functional operation of the LSM and stabilized temperatures as it approaches sunrise. The instrument has successfully executed a total of 172 flip/calibration sequences since being deployed on the lunar surface.

The Solar Wind Spectrometer continues to function normally with no significant change in science or engineering data. Temperatures remain stabilized.

The Suprathermal Ion Detector Experiment is showing very low intensity science data as the instrument continues to function successfully with Channeltron High Voltage ON. The Cold Cathode Gauge high voltage remains in the OFF mode as no attempt has been made to command it ON during the past week. All temperatures continue essentially stabilized.

Status as of 10:00 CST, 15 January was as follows:

Sun Angle	340°
Input Power	73.98 watts
Reserve Power	15.44 watts
Heater and Power Dumps	10 watts ON (DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	21.0°F
PSE Sensor Assembly Temperature	Off Scale LOW
LSM Sensor Temperature (Average)	34.7°C (94.5°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Assembly Temperature	-134.3°C (-209.7°F)
SWS Internal Temperature Module 300	-15.6°C (3.9°F)
SIDE Temperature (Average)	3.5°C (38.3°F)
CCIG Temperature	99.8°K (-279.8°F)

ALSEP WEEKLY SCIENCE REPORT

January 23, 1970

Apollo Lunar Surface Experiments Package Status Report - 12:00 CST, 23 January

ALSEP-1 continues its satisfactory performance, after more than 64 days of uninterrupted operation. The package experienced its second lunar sunrise at 20:00 CST, 16 January. During the times that Mission Control support was not in effect, Phase III operations, remoted site record of downlink only, were actuated. Real time support of ALSEP 1 for the optical terminator crossing was resumed at 16:00 CST, 16 January, and was suspended at 23:35 CST, 17 January. Another extended period of real time support was initiated from 00:00 - 16:00 CST, 19 January, in support of the SIDE. Since that time, nominal two hour per day real time support periods by Mission Control have been in effect.

Central Station telemetry indicates that the average thermal temperature is currently rising at a rate of 0.2°F per hour. DSS Heater 1 (10 watts) was commanded OFF at 03:33 CST, 17 January. The average thermal plate temperature at the time of this command was 41.2°F. RTG output remains constant at 74 watts. Downlink telemetry signal strength is steady at -140 dbm. Since the last reporting period 192 commands have been transmitted to and implemented by ALSEP, bringing the total to date to 1977. The 12-hour timer pulses which have been observed and/or functionally verified as having taken place with normal functional effects are as follows:

Pulse No.	PSE uncage/SP Cal.	LSM Flip/Calibration	Date
109	20:39 CST	20:43 CST	16 January
110	08:37 CST	08:40 CST	17 January
111	20:40 CST	20:40 CST	17 January
112	08:37 CST	08:40 CST	18 January
114	08:37 CST	08:40 CST	19 January
116	08:37 CST	08:40 CST	20 January
118	08:36 CST	08:40 CST	21 January
120	08:36 CST	08:40 CST	22 January

The 12-hour timer pulse number 121 did occur as the functional effects in the PSE housekeeping data were observed at the beginning of the real time support period on January 23rd. No 12-hour timer pulse number 122 occurred during this support period.

The Passive Seismic Experiment is operating satisfactorily. The activity associated with the terminator crossing occurred as expected as tidal tilts of the three long period axes were observed. A considerable seismic event was detected by the X, Y, and Z long period sensors beginning at 14:24 CST, 19 January, and lasting approximately one hour. The PSE sensor temperature (DL-07) returned on scale at 10:46 CST, 17 January, when it read 103.3°F. Releveling of all three long period components in approximate four hour increments following the period of sunrise was required. Since that time, however, releveling of the X and/or Y axes has been required during each real time support period. The Z axis has remained extremely stable. The thermal control mode was commanded to Auto OFF at 08:48 on 20 January.

The Lunar Surface Magnetometer field sensor outputs all returned on scale at 03:49 CST, 17 January, at which time the internal electronics temperature had increased to -10.2°C. A series of steady field offset commands was transmitted shortly thereafter in order to center the sensor outputs. Some variations in magnetic field intensities in all three axes have been indicated subsequently. At resumption of real time support at 07:45 CST, 21 January, the Y field sensor output had a negative 95% full scale deflection. This deflection occurred under the same approximate conditions as it did during the second lunar day. The flip/cal inhibit was commanded IN at 08:45 CST, 21 January, in order to retain 100% of useful Y axis field sensor scientific output while Mission Control support is not in effect. The flip/cal inhibit is to be commanded out, then back in during each real time support period. The LSM internal temperature is presently rising at a rate of 0.3° C per hour, and the sensor temperatures are increasing at a rate of 0.4°C per hour. The instrument has successfully executed 185 flip/calibration sequences to date.

The Solar Wind Spectrometer sensor assembly temperature and internal module average temperature are increasing at a rate of 0.2°C per hour. SWS indicates no significant change in scientific data as the instrument continues to function normally.

The Suprathermal Ion Detector Experiment indicated considerable low energy scientific data in conjunction with the optical terminator crossing. On 19 January, the Channeltron negative 3.5 Kv high voltage went OFF at 06:44 CST, and at the same time the experiment switched from NORMAL MODE to the X10 MODE. This event occurred under the same approximate conditions as it did during the first and second lunar days. The X10 MODE was commanded back ON and the Channeltron high voltage was commanded back ON several times, but each went back into the OFF mode due to the internal arcing. The decision was made to command the Channeltron high voltage OFF and this was done at 14:45 CST, 19 January. The NORMAL MODE was commanded back on just prior to this and continues to operate

in this configuration (NORMAL MODE, Channeltron high voltage OFF and scientific output suspended). No attempt has been made to command the Cold Cathode Gauge high voltage ON since the last reporting period. Engineering data indicates that the SIDE average temperature is increasing at a rate of 1.0°C per hour, while the CCIG sensor temperature is increasing at a rate of 0.3°K per hour.

The Dust Detector east cell output (AX-06) came back on scale in conjunction with sunrise, and the top and west cell outputs returned on scale shortly thereafter. All outputs are closely tracking previously recorded data.

Status as of 11:00 CST, 23 January was as follows:

Sun Angle	78°
Input Power	73.59 watts
Reserve Power	36.76 watts
Heater and Power Dumps	All OFF
Experiment Status	All ON
Thermal Plate Temperature (Average)	94.8°F
PSE Sensor Assembly Temperature	134.17°F
LSM Sensor Temperature (Average)	73.8°C (164.8°F)
LSM Internal Temperature	79.3°C (174.7°F)
SWS Sensor Assembly Temperature	63.7°C (146.7°F)
SWS Internal Temperature Module 300	64.3°C (147.7°F)
SIDE Temperature (Average)	77.7°C (171.9°F)
CCIG Temperature	372.6°K (211.3°F)

ALSEP WEEKLY SCIENCE REPORT
February 6, 1970

Apollo Lunar Surface Experiments Package Status Report - 12:00 CST, 6 February

After more than 79 days of operation, ALSEP 1 continues its satisfactory performance in transmitting to Earth, scientific data from the seismometer, the magnetometer, and the field particle experiment sensors. All experiments and the central station continue to function in the OPERATE mode as a steady 74 watts of power is being provided by the RTG. The package experienced its third lunar sunset at 15:51 CST, 31 January. Due to the constraints of computer time at Mission Control Center, transmitter B was selected during a period of intermittant dropouts of the downlink telemetry. The command to change transmitters was sent at 21:57 CST, 31 January. Transmitter A had operated without interruption for over 1744 hours. Transmitter B has experienced no signal dropouts since its implementation. Signal strength of the downlink telemetry remains steady at -140 dbm. Minor fluctuations in the signal strength occur depending on the characteristics of the remoted site supporting ALSEP. Real time support for the optical terminator crossing was initiated at 13:30 CST, 31 January and suspended at 00:00 CST, 2 February. Since that time, nominal two hour per day real time support periods by Mission Control have been in effect. All other times are being covered by Phase III operations (various remoted sites are scheduled for acquisition and recording of downlink telemetry only).

Current data indicates that the central station continues to function normally. The temperature sensors indicate that no appreciable change has occurred within the past four days, as the average thermal plate temperature remains stabilized at 21 degrees F. DSS Heater 1 was commanded ON at 13:44 CST, 31 January, at which time the average temperature was 28 degrees F. A total of 118 commands were addressed to the command decoder from Mission Control for various experiment adjustments during the past seven days bringing the total number of commands transmitted and implemented to date by ALSEP to 2150. The 12-hour timer pulses which have been observed and/or functionally verified since the last reporting period are as follows:

Pulse No.	PSE Uncage	LSM Flip/Calibration	Date
135	04:45 CST	↑	30 January
136	16:47 CST	Phase III Operations	30 January
137	04:45 CST	↓	31 January
138	16:43 CST	16:44	31 January
139	04:44 CST	04:50	1 February
140	16:42 CST	16:49	1 February
141	04:43 CST	↑	2 February
142	*	|	2 February
143	04:15 CST	|	3 February
144	16:06 CST	|	3 February
145	04:07 CST	Phase III Operations	4 February
146	16:07 CST	|	4 February
147	04:03 CST	|	5 February
148	16:07 CST	|	5 February
149	04:05 CST	↓	6 February

* Phase III Operations were in progress, and the supporting remoted site post track message containing the time of PSE Uncage Status change as a result of the 12 hour timer pulse was not received.

The Passive Seismic Experiment detected seismic activity on the X axis and Y axis long-period horizontal sensors coinciding with the terminator crossing. The PSE also detected a seismic signal lasting twenty minutes in duration at 21:51 CST on 31 January. The seismic event was recorded on the three long-period sensors.

In an effort to further evaluate the thermal characteristics of the PSE instrument during lunar night operations (i.e., thermally stabilizing the sensor unit), an engineering test is currently being performed. This test consists of commanding the Z axis leveling motor ON in the AUTO MODE, and leaving it ON in order to supply an additional 3 watts of heat to the sensor unit. The Z motor ON condition is in addition to the normal operational procedure of commanding the PSE thermal control mode to AUTO ON. Thermal control mode AUTO ON was accomplished at 14:43 CST, 30 January. The Z axis motor ON command was transmitted 1 February at 03:47 CST. Ten hours later (14:00 CST) telemetry point DL-07 indicated the instrument temperature stabilized at 126 degrees F. Data since that time still indicates a stabilized instrument temperature. Frequency of releveling the X axis and Y axis long-period components is currently necessary at periods of up to 48 hours. The Z axis long-period vertical sensor remains extremely stable.

The Lunar Surface Magnetometer Y axis field sensor offset had disappeared at the resumption of real time operations on 30 January. The Y axis temperature at 14:13 CST was 33.2 degrees C, while the instrument's internal temperature indicated 36.4 degrees C.

The LSM field sensor outputs all displayed significantly variant magnetic field intensities at 15:30 CST, 1 February, and diminished slowly thereafter. This activity is not characteristic of the LSM during this time period in the lunation cycle.

The X, Y, and Z axes field sensor outputs disappeared between 10:00 CST, 2 February, and 07:45 CST, 3 February, when Mission Control resumed real time support for that date suspending all LSM science data. The instrument's internal temperature at 07:45 CST was -26.3 degrees C, while the average sensor temperature was 35.7 degrees C. The LSM internal temperature is currently decreasing at a rate of 0.7 degrees C per hour.

The Solar Wind Spectrometer continues to function normally with no significant change in science or engineering data. Temperatures remain stabilized.

The Suprathermal Ion Detector Experiment is currently operating in full functional mode with Channeltron High Voltage ON. Considerable activity was observed in the low energy data immediately prior to the optical terminator crossing. The various SIDE temperatures are currently stabilized. The Cold Cathode Gauge high voltage remains in the OFF mode as no attempt has been made to command it ON during the past week. The CCGE temperature continues stabilized.

The Dust Detector outputs all tracked previous lunar day data until sunset, at which time the west cell output (AX-04) went off scale LOW. The east and vertical outputs both went off scale LOW shortly prior to this.

Status as of 10:00 CST, 6 February was as follows:

Sun Angle	250 degrees
Input Power	73.98 watts
Reserve Power	17.62 watts
Heater and Power Dumps	10 watts ON(DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	21.0°F
PSE Sensor Assembly Temperature	126.0°F
LSM Sensor Temperature (Average)	34.9°C (94.8°F)
LSM Internal Temperature	-28.0°C(-18.4°F)
SWS Sensor Assembly Temperature	-131.7°C(-205.1°F)
SWS Internal Temperature Module 300	-15.2°C (4.6°F)
SIDE Temperature (Average)	4.0°C (39.2°F)
CCIG Temperature	104.7°K (-270.9°F)

ALSEP WEEKLY SCIENCE REPORT
February 13, 1970

Apollo Lunar Surface Experiments Package Status Report - 12:00 CST, 13 February

ALSEP 1, placed on the lunar surface by the Apollo 12 crew, has now functioned successfully for more than 2060 hours, continuously transmitting data of the Moon's environment to Earth. All instruments continue to function in the OPERATE mode, with their scientific data quiescent in the lunar night environment. Downlink telemetry also indicates that the central station and experiments continue to maintain thermal equilibrium, as a steady 74 watts of power is being provided by the thermoelectric generator. ALSEP 1 will experience the start of its fourth lunation as lunar sunrise is predicted to occur at 10:15 CST on February 15. Normal operations now in effect consist of a nominal two hour per day real time support period by Mission Control (Phase II operations). During the time Mission Control is not supporting real time, the various remoted sites are scheduled for acquisition and recording of downlink telemetry (Phase III operations).

The central station continues its excellent operation with the average thermal plate temperature stabilized at 21.0 degrees F. Transmitter B has experienced no loss of signal since its implementation. Downlink telemetry signal strength remains steady at -140 dbm. A total of three commands have been transmitted to the command decoder and implemented by ALSEP 1 since the last reporting period. The cumulative total of transmitted commands is now 2153. The 12-hour pulses which have been functionally verified during the past seven days are as follows:

Pulse No.	PSE Uncage	LSM Flip/Calibration	Date
150	16:11 CST		6 February
151	04:12 CST		7 February
152	16:10 CST		7 February
153	04:12 CST		8 February
154	16:10 CST		8 February
155	04:12 CST		9 February
156	16:10 CST	Phase III Operations	9 February
157	04:13 CST		10 February
158	16:10 CST		10 February
159	04:13 CST		11 February
160	16:10 CST		11 February
161	04:13 CST		12 February
162	16:10 CST		12 February
163	04:13 CST		13 February

The Passive Seismic Experiment sensor temperature remains extremely stable at 126 degrees F. The instrument sensor was thermally stabilized by commanding the Z axis leveling motor ON in the AUTO MODE, in addition to the normal operational procedure of commanding the PSE thermal control mode to AUTO ON. This procedure has resulted in a stabilized sensor which has not required releveling since the last reporting period. No significant seismic activity has been indicated by the instrument during the nominal two hour per day real time support periods.

The Lunar Surface Magnetometer axes field sensor outputs continue to read OFF scale, interrupting science outputs. This interruption is identical to those which occurred during the two previous lunations at the same temperature. Engineering parameters indicate that LSM temperatures remain stabilized.

The Solar Wind Spectrometer temperatures remain stabilized. No significant change in activity has been indicated as the instrument continues to funtion normally.

The Suprathermal Ion Detector Experiment is showing very low intensity science data as the instrument continues to funtion successfully with Channeltron High Voltage ON. The Cold Cathode Gauge high voltage remains in the OFF mode. Both the SIDE and CCIG temperatures continue essentially stabilized.

Status as of 10:00 CST, 13 February was as follows:

Sun Angle	336 degrees
Input Power	73.43 watts
Reserve Power	17.35 watts
Heater and Power Dumps	10 watts ON (DSS-1)
Experiment Status	All ON
Thermal Plate Temperature (Average)	21.0°F
PSE Sensor Assembly Temperature	125.9°F
LSM Sensor Temperature (Average)	34.9°C (94.8°F)
LSM Internal Temperature	-28.0°C (-18.4°F)
SWS Sensor Assembly Temperature	-134.3°C (-209.7°F)
SWS Internal Temperature Module 300	-15.6°C (3.9°F)
SIDE Temperature (Average)	3.7°C (38.7°F)
CCIG Temperature	101.3°K (-277.1°F)