

SL-III MC-1/1

Time: 05:01 CDT 09:10:01 GMT  
7/28/73

LCC This is Skylab launch control. T minus 1 hour 7 minutes and counting toward lift off in the second manned mission in Skylab. At this time checks are underway on the radar beacon aboard the space vehicle. There are two of these beacons actually located in the instrument unit of the Saturn 1B. They're used in conjunction with ground radars to track the velocity position and the acceleration of the vehicle during the power phase of flight. Up at the 320 foot level at the pad launch complex 39, the close out crew are making their final preparations. They are taking down some connector panels which connect the white room to the space craft and sealing off the boost protective cover hatch, which has now been pulled closed. We're continuing to aim for a lift off time of 7:10:50, that is 10 minutes 50 seconds after 7:00 a.m. eastern daylight time this morning. Now T minus 1 hour 6 minutes and counting, this is Kennedy Launch Control.

END OF TAPE

SL-III MC-2/1

Time: 05:10 CDT 09:10:11 GMT  
7/28/73

LCC This is Skylab Launch Control. T minus 56 minutes 58 seconds and counting. Just completed was a very critical power transfer test. During this test the power is transferred from the ground source, which has been being used up to this point to conserve on the flight batteries. Transfer to those flight batteries to ensure that all systems are operating during and after that transfer. Transfer was made, the various elements of the launch team reported in that systems continued operating correctly. We switch back then to the ground source and we'll stay on that ground source down to a T minus 50 second mark in the countdown at which time we'll switch finally to the flight batteries and stay on the flight batteries from that point on. Coming up in the countdown are checks of the digital rain safety receivers aboard the space vehicle. These receivers are part of what's called the secure arrange safety systems aboard the Skylab. A range safety officer could send a destruct signal to the rockets if it became erratic or straight off course. He would do this by initiating the emergency cut off, and if necessary, the propellant dispersion command. The systems are located on each stage of the Saturn 1B. The two receivers in each stage and they receive the signal from the range safety officer, and then send them through the proper channels to perform the propellant dispersion. These actions of course will be taken only if the vehicle were so erratic that it endangered land areas, and also only after the crew has been advised and has used one of the escape options that is open to them. Countdown proceeding smoothly now in the final hour. T minus 55 minutes 23 seconds and counting, this is Kennedy Launch Control.

END OF TAPE



SL III MC3/1

Time: 05:23 CDT 09:10:23 GMT

7/28/73

LCC This is Skylab Launch Control, T-minus 45 minutes and counting. Chief Staff Supervisor, Bill Schick advises that the swing arm, swing arm number 9, with the environmental chamber will be coming back, it's coming back now to the 12 degree or park position. Schick advises also this and other aspects of the count continue to go well. All on time or actually running somewhat ahead of schedule. The environmental chamber at the end of swing arm 9, will remain at the park position here. This is about 10 to 12 feet from the spacecraft. It could be quickly moved back to the spacecraft in an emergency. Swing arm number 9 is somewhat of a misnomer, the facilities here at complex 39 were designed for the larger Saturn V vehicle, 365-foot tall. Specially designed 127-foot pedestal adapts the smaller Saturn 1B so that it does use the same upper swing arm. Actually this is the fifth of the five swing arms used for the Saturn 1B, but it does continue to carry that swing arm 9 designator, which it gained back in the Saturn V program. Once the swingarm is moved back, launch escape system is armed. That's the small rocket tower that can be seen perched on top of the command module. That system could be used by the astronauts in an emergency to pull the command module free of the space vehicle. It would lift it up in an arcing path, high enough so that the parachutes could deploy and it could come down for a normal landing. That launch escape system, interestingly enough, develops a 147,000 pounds of thrust, that's about twice that developed by the Mercury Redstone rocket, which launched our first two astronauts into suborbital space. However that's a rather short duration burn of 3.2 minutes for the launch escape system. The escape system itself is 33 feet long, weighs about 8,000 pounds. Now, T minus 42 minutes 57 seconds and counting. This is Kennedy Launch Control.

END OF TAPE

SL-III MC-4/1

Time: 05:00 CDT 9:10:00 GMT

7/28/73

LCC This is Skylab Launch Control. T minus 34 minutes 59 seconds and counting. The closeout crew, which left the pad area just a short time ago, has now cleared that area. And the test supervisor, Chuck Henschel has announced that the KSC area is now cleared for launch. Range safety command receiver checks now have been completed and also the replenishing of the liquid oxygen and liquid hydrogen is continuing. Liquid oxygen and liquid hydrogen, the cryogenic fuels for the Saturn 1B, were loaded earlier this morning. Actually completed loading at about the T minus 4 hour mark in the countdown. These are continuing to be replenished down through the countdown until we get into the terminal sequencer; the replenishing is then stopped. It is necessary to replenish these because there is some boil off that takes place. T minus 34 minutes 11 seconds and counting, this is Kennedy Launch Control.

END OF TAPE



SL-III MC 5/1

Time: 05:45 CDT, 09:10:45 GET

7/28/73

LCC This is Skylab Launch Control, we are T minus 23 minutes 48 seconds and counting toward the lift off of the second manned mission in the Skylab program. Count continuing to go smoothly here at Launch Complex 39. Preflight command checks with the Mission Control Center in Houston have just been completed. These are the checks of the systems which are used to remotely command various functions in the vehicle. Checkout of radar beacon number 1 has been completed. Checkout of radar beacon number 2 underway as all continues to go well. Science pilot Owen Garriott at this time is completing some checks of the service module reaction control system. He's armed that system which in a sense means that he has opened valves allowing the hypergolic fuels to flow down to the engine area. Hypergolic fuels are ones that ignite on contact. In this case, for the service module reaction control system, these fuels are monomethyl hydrazine and nitrogen tetroxide. The system has been pressurized, Garriott is now reading off the different temperatures and pressures and the fuel quantities. Hypergolic fuels are actually loaded aboard the service module well before the countdown began. Service module reaction control system provides stabilization and control of the spacecraft during Earth orbit and docking. It can also be used for minor course changes or the backup system for deorbiting the spacecraft. We're continuing to look for 7:10 lift-off. Actually to be more accurate 07:10:50, 50 seconds after 07:10. We have a window which extends to 07:19:27, that's a.m. eastern daylight time. Weather continues to look good. The sun is about to come here at Kennedy Space Center, it's coming up through some cloud cover, we expect some of that to blow off and at lift-off time, approximately 22 minutes from now, we'll be looking for some scattered clouds, surface winds at 6 knots, temperature is approximately 76 degrees fahrenheit, and a visibility of about 8 miles. There is a possibility of some ground fog but 8 miles visibility should be good in most areas. T minus 21 minutes 44 seconds and counting, this is Kennedy Launch Control.

END OF TAPE



SL-III MC 6/1

Time: 05:53 CDT 09:10:53 GMT  
7/28/73

MCC This is Skylab Launch Control. T minus 15 minutes and we're in a planned brief hold at this time. This is actually a clock adjustment hold. It's to insured that we are lifting off at the proper time to get us in the best trajectory toward the orbiting laboratory. We'll resume our countdown at 6:55:50 seconds. That's 6:55 am and 50 seconds. Chief Test Supervisor Bill Schick just reported to us before going into the hold that all systems are in good shape the countdown has been running very smoothly. As we lift off at 7:50 this morning the orbiting Skylab will be some 300 nautical miles South of Newfoundland. Predicted lift-off time 7:10:50 at this time. The orbiting lab of course was launched back on May 14. Flight controllers out at Houston report that all systems aboard there are in good shape and ready for the second crew to move in and set up housekeeping. That crew aboard the command service module this morning eager to get there. When the count resumes at the T minus 15 minutes mark the ?Launch operations manager Paul Donnelley here in the firing room he has the abort advisory responsibility up to the point when the space vehicle clears the tower. He'll make some communication checks with the astronauts on the special astro launch circuit. This is a circuit on which the spacecraft test conductor, the astronaut communicator Bob Crippen here in the firing room and Donnelly use with the astronauts during the final 4 minutes of launch. This is essentially to isolate them from any other discussions which might be going on in the operational intercom system here in the firing room which link together the various members of the launch team. Also as the count resumes spacecraft will be going to full internal power. Up to this point it has been powered by the fuel cells aboard the spacecraft but also it has had a ground source fed to it as a backup. We're about to resume the count.

MARK. T minus 15 minutes and counting now. Preparations under way at this time now to chill the systems in the second stage which will be receiving the very cold liquid hydrogen after first stage burnout and as the second stage ignites. T minus 14 minutes 45 seconds and counting. This is Kennedy Launch Control.

END OF TAPE



SL-III MC-7/1

Time: 06:01 CDT 01:11:01 GMT  
7/28/73

LCC This is Skylab Launch Control. T minus 8 minutes 59 seconds and counting. Bean, Garriott and Lousma are now finishing up their checks inside the spacecraft. Final launch vehicle checks also being made now before going on the automatic sequencer. There is not an ignition switch or button for the Saturn launches either the Saturn 5 or the Saturn 1B. An automatic sequencer takes over the count at T minus 3 minutes and 7 seconds. And that sequencer then initiates all action from that time, including the ignition. There are some 91 cameras out at the pad that will cover the action at ignition detailing the sequence of events for engineers to study after the launch. A number of visitors here at Kennedy Space Center have jammed the entire space center. 35000 guests have taken all available space on the space center and this does not include thousands of people who are lining the highways nearby. T minus 8 minutes 8 seconds and counting. This is Kennedy Launch Control.

END OF TAPE

SL-III MC-8/1

Time: 06:04 CDT 01:11:04 GMT  
7/28/73

LCC This is Skylab Launch Control passing the 6 minute mark in the countdown. T minus 5 minutes 57 seconds and counting. At this time various elements of the Skylab team reporting in to the test supervisor with their go or no go status. This team includes the mission controllers in Houston. The Program Director who is watching from here at Kennedy Space Center for this launch. The Air Force Eastern test range who will perform tracking during the powered phase of the flight, and of course the launch team here in the firing room, all reporting in at this time. Houston flight just reported in that they are go for the start of the automatic sequencer. The Program Director William Schneider also reports we're go for launch. Swing arm number 9, that's the access arm that reaches across the launch tower to the spacecraft, will be swinging back to the full retract position just a few moments from now. Up to this point it's been in a park position for about the last 40 minutes in a stand by park position about 10 to 15 feet from the spacecraft. T minus 5 minutes. And swing arm number 9 coming back now. It will swing back 180 degrees, and a fully park position beside the launch tower and it will remain there now through launch. Safety and test support now reporting to the test supervisor Chuck Henschel that we are go for launch. The range also says we are go for launch. Launch Operations Manager, Paul Donnelly has given his go and Walter Kapryan, Director of Launch Operations gives us a go for launch. T minus 4 minutes 32 seconds and counting, this is Kennedy Launch Control.

END OF TAPE



SL-III MC 9/1

Time: 06:06 CDT 01:11:06 GMT  
7/28/73

LCC This is Skylab Launch Control. T minus 3 yes, 3 minutes 30 seconds and continuing to count. Launch Vehicle Test Conductor Norm Carlson has reported to the Test Supervisor that the launch vehicle is cleared for launch. Essentially what he is saying is the launch vehicle is ready to go on the automatic sequencer. The automatic sequencer comes into play at T minus 3 minutes 7 seconds in the countdown. Launch sequence has started now we passed the three minutes 7 seconds mark and we're on the automatic sequencer. Liquid oxygen and liquid hydrogen have been being replenished up to this point. That replenish now will be terminated, the vents will be closed and the fuel tanks will be pressurized. This replenish has been necessary since these are cryogenic or extremely cold fuels which do boil off. They were fueled. Fueling was completely about 5 hours before launch and it's necessary to continue to replenish them on down through the final portion of the countdown. Various elements of the launch team now reporting in. All coming in on a go condition. T minus 2 minutes 20 seconds and continuing to count. Here in the firing room we are having what's called operational silence. The men have reported in that they're go. There will be no further reporting in now except when they see a problem. If they saw a problem they could report in. Could request an override to this automatic sequencer and stop the count. Bob Crippen the Astronaut Communicator here in the firing room is reporting the countdown clock times to the crew. Chuck Henschel the test supervisor reporting - -

END OF TAPE



SL-III MC-10/1

Time: 06:08 CST 09:11:08 GMT

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LCC - - supervisor reporting the countdown clock times here to the firing room team. Paul Downey, the Launch Operations Manager just called up to the crew, said the launch team wishes you good luck, and Godspeed. T minus 1 minute 36 seconds and counting. A large status board here in the firing room shows the status of the various systems and also shows the action being taken by the automatic sequencer. The instrument unit ready light now is on. The emergency detection system ready light is on. Launch sequence start light of course came on at the T minus 3 minute 7 second mark in the countdown. Pressurization of the tanks now showing up now on our status board. SIVB LOX tank now pressurized. SLB fuel tank pressurized as we approach the 1 minute mark in the countdown. MARK. T minus 1 minute, T minus 1 minute and counting. In the spacecraft, Garriot and Lousma have essentially completed their check out, and their - astronauts Bean, Garriot and Lousma, they are ready to become the second manned crew to man the orbiting Skylaboratory. T minus 42 seconds. Spacecraft commander now has made the final guidance alignment. That's the final action to be taken by the crew onboard the spacecraft until after the launch. T minus 30 seconds. T minus 30 seconds and counting. The eight first stage engines will ignite at 3.1 seconds in our countdown. They will be held down while thrust is built up until the zero mark at which time we'll get liftoff. We'll be looking for liftoff right at the T zero mark. We passed the 15 second mark in the count. T minus 10, 9, 8, 7, 6, 5, 4, 3, 2. We have ignition sequence start. All ignitions - all ignitions are running, all engines running. We have a liftoff. And the second manned crew has cleared the tower.

CDR Roll and pitch program, Houston.

CC Roger, roll and pitch, Skylab. And thrust looks good on all engines.

PAO Al Bean reports. Al Bean reports the automatic maneuver that puts Skylab on the proper course. Altitude 0.7 of a mile. Velocity 1432 feet per second. 36 seconds.

CDR It's got a pretty noise to it right now.

CC Roger that. You're looking real good.

PAO Fifty seconds. 2-1/2 miles high.

1700 feet per second.

CDR Comm down.

CC Roger. Stand by for Mode 1 Bravo.

CDR Roll arc (garble).

CC Mode 1 Bravo.

CC Roger.

CDR Propellant DUMP is RCS command.



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CC Roger.

PLT I get a great feeling of motion up here,  
Dick. I really feel like it's moving out.

CC Roger, PLT. And Skylab, Houston, you're  
feet wet.

CDR Understand.

PAO One minute 30 seconds, 10 miles high now,  
5 miles down range. Velocity 3280 feet per second. Thrust  
still looking good. Trajectory looking good.

CDR EDB engine out and LV rates off.

CC Stand by for Mode 1 Charlie capability.

MARK. 1 Charlie.

CDR Understand.

CC Skylab, Houston. Go for staging.

CDR Roger. GO here.

PAO Twenty-two miles high, 19 miles down range.  
Velocity 5800 feet per second. Standing by for staging.

CDR Inboards. Outboards. Staging.

CC Roger.

PAO Good staging. Ignition on the SIVB stage.

CC Roger. We're watching the thrust come up now.

Skylab, Houston. Thrust looks good on SIVB.

CDR That's good news.

PAO Two minutes 45 seconds. Altitude 41-1/2  
miles. Velocity 7695 feet per second. Down range 60 miles -  
now.

CC Roger. Tower jettison, you're mode 2.-

CDR Guidance initiate.

CC Roger. Everything is looking real good,  
you're GO in 3 minutes.

CDR It's nice and bright up here in the Sun.

CC Roger.

PAO Three minutes 15 seconds. Altitude 55 miles,  
down range 90 miles, velocity 8889 feet per second. Thrust  
still good on the second stage.

PLT Okay, Dick, the cabin pressure is locked up  
real good here. You should have seen that tower go.

CC Roger. Understand.

CDR And we're GO at 4 minutes.-

CC Roger, Skylab. We concur, you're GO

- in 4.

PAO Everything is still looking good. Skylab  
now 142 miles down range. Altitude 70 miles, velocity  
9135 feet per second.

PLT Hey, we'd like to try that lift-off again.  
That was great there Dick.



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Time: 06:08 CDT 09:11:08 GMT

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CC My turn next.  
PAO That's a report there from Jack Lousma.  
Four minutes 40 seconds down range now, 197 nautical miles  
altitude 80 miles, velocity 10027 feet per second. Skylab  
has achieved 34 percent of the velocity needed for orbit.  
CC There you GO at 5 A looking real great.  
PAO Five minutes 35 seconds. Down range  
283 nautical miles now, 88 miles high, 11687 feet per second.  
PLT Go at 6.  
CC Roger, CDR. Go at 6.  
PAO Skylab has 47 percent of the velocity needed  
for orbit now. 12796 feet per second. Down range 354 nautical  
miles. Altitude 91-1/2.  
PLT We're right on time.  
CC Roger. Omni Charlie. Thank you, sir.  
PLT I want to keep old Ed down there happy.  
CC He's happy.  
CDR Okay, we just put on the gimbal motors,  
Houston.  
CC Roger, CDR.  
CC Skylab, Houston. We see 4 good gimbal  
motors, good trims. You're go at 7 minutes, looking real good.  
CDR Roger.  
PAO Seven minutes 10 seconds now. Down range  
473 nautical miles, velocity 15380 feet per second, altitude  
92 nautical miles. Seven minutes 40 seconds. Skylab now  
has 65 percent of the velocity needed for orbit.  
CDR PU shift, Houston. We're go at 8.  
CC Roger, PU shift. And we concur, you're go  
at 8 minutes.  
PAO Propellant utilization shift. The mixture  
ratio for the propellant has changed now to provide a better  
propellant feed at altitude. Eight minutes 16 seconds.  
Skylab now 648 nautical miles down range. Altitude 89 nautical  
miles. Velocity 19172 feet per second. 75 percent of the  
velocity needed for orbit now achieved.  
CDR We're go at 9, Houston.  
CC Roger, CDR, go at 9 minutes.  
PAO Flight Director Phil Shaffer taking a  
status for the Eurasian gate.  
CDR - - in the CMF.  
CC Roger.  
PAO He advises the range safety officer that  
Skylab is go at the gate. Passing that gate will permit Skylab  
to fly over portions of the land masses of Europe and Asia.  
CC CDR, Houston. We're predicting a guidance



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CC cutoff at 9 plus 53.  
CDR Roger, 9 plus 53.  
CC Stand by for mode 3 Alfa capability.  
MARK. Mode 3 Alfa.  
CDR Roger, 3 Alfa.  
CC Stand by for mode 4 capability. MARK.  
mode 4.  
CDR Roger, mode 4.  
PAO Skylab could now get into orbit if it  
had to abort, using the service propulsion system. At 9 min-  
utes 50 seconds.  
CDR 125, 709. 122.2 by 83.2, we look good.  
CC Sounds real great.  
PLT You sure know it when it quits.  
CC Roger.  
PAO That was an onboard readout of the orbit,  
122.2 nautical miles by 82.2 anautical miles. We'll confirm  
the orbit with tracking in a little bit.  
CC Skylab, Houston. We've confirmed your orbit  
and you're GO for orbit. Looks good.  
CDR Okay, tell the guys at KSC thanks. It  
was a nice, nice job.  
CC Roger, Al.  
PAO And the heaviest command and service module  
ever to be launched is now in orbit, 13410 pounds.  
CC Hold separation sequence. We're about 45 sec-  
onds from LOS in Bermuda. We're going to drop out for about a  
minute and a half, and I'll give you a call at ARIA.  
CDR Okay.

END OF TAPE  
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PAO The first Skylab command and service  
module held a weight record before this, that weight was  
13,383 pounds. We're standing by for communications through  
a tracking aircraft.  
CC Skylab, Houston, through ARIA. How  
do you read?  
CDR Read you pretty good, Dick. Everything's  
going along all right.  
CC Roger. I hear a little bit of static  
on the line but I heard fairly reasonably. We're standing by.  
CDR Okay.  
CDR And we're standing by for (garble), Houston.  
CC Roger.  
SPEAKER Out stretchers are too long. As we move by  
rapidly, it looks almost like we're above some strated layer at  
5000 feet or something like that. They are really moving  
out.  
CC Roger.  
PAO This is Skylab control at 16 minutes  
ground elapsed time. Communication is very bad through the  
aircraft. Skylab will be acquired by the Madrid tracking  
station in about 3-1/2 minutes.

END OF TAPE