

Apollo 11 Highlights Day 1

PAO ...T-10, 9, 8, we have a GO for main engine start. We have main engine start, 4, 3, 2, 1, O.

PAO Thirty seconds and counting. Astronauts report it feels good. T minus 25 seconds. 20 seconds and counting. T minus 15 seconds. Guidance is internal. 12, 11, 10, 9. Ignition sequence starts. 6, 5, 4, 3, 2, 1, 0. All engines running. Liftoff. We have a liftoff, 32 minutes past the hour, liftoff on Apollo 11. Tower cleared.

SC One Bravo.

CAPCOM 11, Houston, you're good at one minute.

CAPCOM Shut down right on time.

SC 101.4 by 103.6

CAPCOM Roger. Shut down and we copy 101.4 by 103.6.

CAPCOM Apollo 11, this is Houston. You are confirmed to go for orbit.

SC Roger.

CAPCOM Apollo 11, this is Houston. You are go for TLI. Over.

SC Apollo 11. Thank you.

CAPCOM Roger. Out.

SC Ignition.

CAPCOM We confirm ignition and the thrust is GO.

CAPCOM Apollo 11, this is Houston at one minute. Trajectory and guidance looks good and the stage is good. Over.

SC Apollo 11, roger.

PAO Speed 5000 feet per second

PAO Cut out. We're showing velocity 35, 570 feet per second. Altitude 177 nautical miles.

SC Okay, Houston, Apollo 11. That Saturn gave us a magnificent ride

CAPCOM Ah, Roger, 11, we'll pass that on and it's certainly looks like you're rolling your way now.

PAO That was Neil Armstrong praising the launch vehicle.

SC We have no complaints with any of those three stages on, on that, that ride. It was beautiful.

CAPCOM Roger. We copy. No transients at staging of any significance? Over.

SC That's right. It was nominal, all a good ride.

CAPCOM Houston, roger, out.

CAPCOM Apollo 11, this is Houston. For your information we expect the maneuver to separation attitude to begin at 3 plus 05 plus 03 and to be completed at plus 09 plus 20. Separation at 3 plus 15 plus 00.

SC Roger, time to begin maneuvers in 30503 complete 30920 and separation 3 plus 15 00.

CAPCOM Roger. That's separation should be 3 plus 15 03, my error in reading up.

SC Roger.

PAO This is Apollo Control. The velocity falling off now. Immediately after shutdown we're showing 34,000 feet per second now, that the altitude building, 512 nautical miles.

CAPCOM Apollo 11, this is Houston. All the booster functions are proceeding normally. The sequencing is in good shape and it doesn't look like they're having any problems at all. Over.

SC Roger.

PAO This is Apollo Control and we're showing orbital weight now, 138 892.9 pounds.

CAPCOM Apollo 11, Apollo 11, this is Houston. Over.

SC Hello, Houston. Hello, Houston. This is Apollo 11. I'm reading you loud and clear. Go ahead, over.

CAPCOM Roger, 11, this is Houston. We had to shift stations. We weren't reading you through Gulfstone. We show pyro A armed and pyro B not armed at the present time. Over.

SC That's affirmative, Houston. It's affirmative.

CAPCOM Roger.

PAO The S-IVB has completed its maneuver to separation attitude.

PAO 4 minutes away from separation, 4 minutes.

PAO At 3 hours 11 minutes into the mission, velocity 26,314 feet per second, distance from Earth 3, 140 nautical miles.

PAO The S-IVB is reported in a stable attitude for this separation.

PAO Rates are less than 1/10th of a foot per second in all axis. One minute to separation.

CAPCOM Apollo 11, this is Houston. You are GO for separation. Our system's recommendation is arm both pyro busses. Over.

SC Okay, Pyro B coming armed. My intent is to use bottle primary 1 as per the checklist. Therefore I just A on.

CAPCOM Roger, we confer with the logic.

PAO We are waiting confirmation of separation.

SC And (garbled) secondary propellant B went (garbled).

CAPCOM That was secondary propellant on quad BRAVO?

SC Quad BRAVO, yes. Both the primary and secondary (garbled).

SC Houston, stand by.

CAPCOM Apollo 11, this is Houston. Radio check. Over.

CAPCOM Roger. We're copying you about 5 by 2, very weak. Can you give us a status report, please?

SC Roger. We are docked and we do want acquisition with the high gain at this time, I think.

CAPCOM Understand you are using the high gain, over.

SC That's affirmative.

CAPCOM Roger. I read you very loud and clear, Buzz. Mike is pretty weak.

SC Roger. We've got the high gain locked on now, I believe, auto tracking now.

CAPCOM Okay. You're coming in loud and clear but Mike is just barely readable.

SC That was Neil. How you reading Mike?

CAPCOM Ah, loud and clear now, Mike, and we understand that you are docked.

SC That is affirmative.

SC Houston, CDR how do you read (garbled).

CAPCOM 11, CDR, loud and clear, Neil.

SC Okay.

PAO This is Apollo Control. Apollo 11's velocity now 21,096 feet per second, distance from Earth 6,649 nautical miles.

CAPCOM Alright, 11, this is Houston. Over.

SC Houston, Apollo 11, go ahead.

CAPCOM Ah, Roger. When you commented on that BRAVO problem at separation, you were a little weak. Could you go through what you did after you noticed the talk-back again, please?

CAPCOM We copied the primary and secondary propellant talkback SM RCS BRAVO 1 (garbled).

SC Roger. Roger, that is affirmative and we moved that switch to the open position and they went back to gray. Over.

PAO This is Apollo Control. We are at 34 minutes away from extraction from extraction from the lunar module from its adaptor in the third stage of the Saturn. The crew has started pressurizing the LM.

CAPCOM Apollo 11, this is Houston. Over.

SC Roger. Houston, Apollo 11, go ahead.

CAPCOM Roger. Could you give us some comments on how the transposition docking went? Over.

SC I thought it went pretty well, Houston, although I suspect I used more gas than I've been using in the simulator. The turnaround maneuver, I went pitch, accel command and started to pitch up and then when I put the manual attitude pitch back to rate command, for some reason it, it stopped its pitch rate and I had to go back to excel command and hit what I thought was an extra proceed on the DSKY key. Then during the course of that, we drifted slightly further away from the S-IV B than I expected. I expected to be out about 66 feet and my guess would be I was around a hundred or so and, therefore, I expect I used a bit more coming back in but except for using a little more gas, and I'd be interested in your numbers, everything went nominally.

CAPCOM This is Houston. Roger. We copy.

PAO That was Mike Collins giving the description on the transposition and docking.

SC This is Apollo 11. Over.

CAPCOM Go ahead, 11.

SC Bruce, we're working on the pressurization on the LM now and working off the decal of the SM LM pressure equalization and we're down to Step 13 where we're waiting for the cabin pressure to be 5 or it should be roughly 5 before we turn the repress package O₂ valve to FILL. Instead of 5 we're running about 4.4. Over.

CAPCOM Ah, Roger. Stand by a second.

SC And, Houston, Apollo 11, we just put the repress package O₂ valve to FILL momentarily there in Step 13 and we have filled the bottles back up partially. What's the pressure reading on them?

SC We have about 450 PSI in the, in the 3 1-pound bottles.

CAPCOM Stand by a second, please.

SC Roger. Standing by. And the repress package valve is now in the OFF position. What's the cabin pressure now, Buzz? Cabin pressure is now 4.5.

PAO At 3 hours 46 minutes, velocity is 18,917 feet per second, distance from Earth 9,002 nautical miles.

SC Houston, Apollo 11. We think these readings are within normal tolerances. We just wanted to get your concurrence before we press down any further with the decals.

CAPCOM Okay, Captain.

SC Ah, Houston, Apollo 11. How do you read?

CAPCOM Apollo 11, this is Houston. Go ahead.

SC LM looks to be in pretty fine shape from about all we can see from here.

CAPCOM Okay, and in reference to your question on this Step 13 on the decal, I understand that you have used up the contents of the repress O2 and at that time instead of being up to 5 PSI, you were reading 4.4. Is that correct?

SC Okay. 4-4, yes, sir.

CAPCOM Okay, and you want to know if you can go ahead and use additional oxygen to bring the command module up to 5.0 and continue the equalization? Over.

SC We think it's within normal balance, Bruce, but we just wanted your concurrence before we press on with this procedure.

CAPCOM Roger, Apollo 11. Go ahead.

SC Okay. We're pressing on with the procedure.

CAPCOM And 11, Houston. We have a request for you. On the service module, secondary propellant fuel pressurization valve, as a precautionary measure, we'd like you to momentarily cycle the 4 switches to the close position and then release. As you know, we have no TM or talkback on these valve positions and it's conceivable that one of them might also have been moved into a different position by the shock of separation. Over.

SC Okay. Good idea. That's being done.

CAPCOM Houston, roger. Out.

CAPCOM Apollo 11, Houston. We're doing a non-propulsive vat on the booster at the present time. You may see some sort of a cloud coming out of it and when you're ready I have your evasive maneuver pad.

SC Roger. That's coming out.

CAPCOM Roger. Out.

SC It's a haze. It's going by toward our minus X direction and several small particles are moving along with it. A natural velocity is fairly high. At least it appears to be high and we've got an O₂ high, flow high right now.

CAPCOM Houston, roger. Out.

SC And Houston, you might be interested that out my firsthand window right now I can observe the entire continent of North America, Alaska, over the pole down to the Yucatan Peninsula, Cuba, northern part of South America and then I run out of window.

CAPCOM Roger. We copy.

PAO That was Neil Armstrong with that report.

SC Houston. Apollo 11. All twelve latches are locked.

CAPCOM Roger 11. This is Houston. Understand 12 latches locked.

PAO And that was Buzz Aldrin reporting that all 12 of the latches in the docking mechanism had locked.

SC 11, Houston. Whenever you're possessed of a free moment, we've got this Evasive Maneuver Pad.

CAPCOM Okay.

SC Go ahead, Houston. Apollo 11 ready to copy.

CAPCOM Apollo 11, this is Houston. Evasive Maneuver, SPS G&N 63481 plus 095 minus 020. GTI is 004 40 01 00 plus 000 51 plus all balls plus 00190. ROLL is your option. PITCH 213 357. NOUN 44 is NA Δ VT is 00 197 003 00152. The rest of the pad is NA. No ullage. LM weight 33290. Read back. Over.

CAPCOM Apollo 11, this is Houston, standing by for your read back. Over.

CAPCOM 11, Houston. Do you read? Over.

CAPCOM Apollo 11, this is Houston. Do you read? Over.

SC Alright. All of a sudden, we had a little click and the signal strength began to start dropping off. Your transmissions were cut off very abruptly. How do you read now?

CAPCOM Roger. Loud and clear. We had a handover to Madrid about the time, I was I guess halfway through the pad. If you could give me the last value you read, I'll pick up there. Over.

SC Okay. Start with Δ VA. Over.

CAPCOM Roger. Δ VZ is plus 00190. ROLL your option. PITCH 213 357 and NOUN 44 is NA Δ VT is 00 197 003 00152. The rest of the pad is NA and no ullage. LM weight 33290. Read back. Over.

SC Roger. Houston. Evasive Maneuver SPS G&N 63481 plus 095 minus 020. 004 40 01 00 plus 000 51 plus all zeroes plus 00190. ROLL, crew option. 213 357 NA 00 197 003 00152. LM weight 33290. Over.

CAPCOM 11, this is Houston. Read back correct. Out.

PAO This is Apollo Control at 4 hours 4 minutes. Apollo's velocity now is 17,014 feet per second. It's distance from Earth, 11,753 nautical miles. We're about 5 minutes away from ejection of the lunar module and about 35 minutes away from this evasive maneuver. The ignition on the evasive maneuver an elapsed time of 4 hours 40 minutes 1 second. It will be a service propulsion system burn of 3 seconds duration, Δ V 19.7 feet per second.

SC Houston. Apollo 11.

CAPCOM Go ahead 11.

SC We'd like to arm our logic switches.

CAPCOM Okay, go ahead with the logic.

SC Okay, mark logic 1 and 2 armed.

CAPCOM Roger. We show the logic armed and you're GO for pyro alarm.

SC Houston, we're ready for LM ejection.

CAPCOM Roger, you're go for LM ejection.

SC Thank you.

SC Houston, we are sep. We have a cryo press light.

CAPCOM Roger, copy. Cryo press light.

CAPCOM Roger, 11. We recommend that you turn the O₂ fans on manually and insure that the O₂ heaters are in the automatic position.

SC Roger, O₂ heaters are on and we're going to cycle the O₂ fans now.

CAPCOM Roger, O₂ heaters to auto or you can watch them in the armed position and O₂ fans manual on.

CAPCOM Apollo 11, this is Houston, over.

SC This is Apollo 11.

CAPCOM Roger. In reference to your question on RCS usage, it looks like you are about 18, maybe 20 pounds below nominal at the present time. No problem at all. Over.

SC Great.

SC Wanted to be 18 – 20 pounds above nominal.

CAPCOM Sorry about that.

PAO This is Apollo Control at 4 hours 34 minutes. Apollo 11's velocity is 14,972 feet per second. Its distance from Earth is 15,895 nautical miles. Spacecraft weight 96,760.9 pounds. We're about 5 minutes from the Evasive Maneuver – that one sure there will be no problems of re contact between the spacecraft and the S IV B stage of the launch vehicle.

CAPCOM 11, Houston. Your systems are looking good. We're standing by for the burn.

PAO The duration of this burn will be 3 seconds. Delta V 19.7 feet per second.

PAO Ignition. Shut down.

SC Houston, Apollo 11. Could you confirm that pitch gimbal motor turned off? We just shut all 4 off and we got a questionable indication on the ECS on PITCH 1.

CAPCOM Roger. Stand by a second.

CAPCOM Apollo 11, this is Houston. Stand by, please.

SC Go ahead, Houston. Did you copy our residuals?

CAPCOM Roger. We got 00 and .2 it looks like.

SC We had .1 a while ago. It just went to .2.

CAPCOM Okay.

SC That EMS Delta-V counter is minus 4.0.

CAPCOM Minus 4.0, roger.

SC And how about pitch gimbal 1? Can you confirm that off?

CAPCOM Can you stand by just a second on that? At the present time, we cannot confirm it off. We saw a current drop indicating that several gimbal motors had gone off. We'll be back with you in just a second on it, over.

SC Okay. If necessary, we can recycle it.

CAPCOM Apollo 11, this is Houston. If you go ahead and cycle Pitch gimbal motor number 1 on and then off and give us a mark and we'll tell you what we see. Over.

SC Okay, fine. It's coming back on, ready, mark. It's going back off, ready, mark. And that time we got an on board indication, Houston. Thank you a lot.

CAPCOM Roger, we confirm that it is off.

SC Yah, we do likewise.

PAO This is Apollo Control at 4 hours 44 minutes. A news conference at the Kennedy Space Center is about to begin. We will take down the live circuits and tape air to ground during this news conference, play it back after the conference. This is Mission Control Houston.

PAO This is Apollo Control at 5 hours 11 minutes into the mission. The S IV B slingshot maneuver was completed about 5 minutes ago, designed to put the third stage of the launch vehicle into a trajectory, will take it behind the trailing edge of the moon and then into a solar orbit. The crew did not witness this maneuver. The Command Module was not in the proper attitude where they could see the S IV B at the time. We've advised the crew that we do not believe we will do the first mid-course correction, that we'll wait for mid-course correction 2 tomorrow and expect a Delta-V to be performed in that maneuver of about 21.3 feet per second. We've also had some other brief transmissions including comments from Neil Armstrong on the view out the window and a weather report on a part of the world he can see. We have the tape of these transmissions that have occurred during the news conference at the Cape. We'll play that for you now and then catch up live.

SC Houston, Apollo 11. We're starting our maneuver to observe the S IV B slingshot.

CAPCOM Roger, 11. We've got an updated attitude for you on the slingshot operation.

SC Okay, say the angle please.

CAPCOM Roger, ROLL 002.5. PITCH 289.3. YAW 357.5 and there's also an update, minor correction to your attitude for the P 52. Over.

SC Roger, I have ROLL 2.5. PITCH 289.3 and YAW 357.5. Over.

CAPCOM Roger, and for your P 52 and optics calibration it'll be ROLL 346.5. PITCH 345.0. YAW 0007.8, over.

SC Roger, 346.5, 345.0 and 7.8. Thank you.

CAPCOM Houston, roger, out.

CAPCOM Apollo 11, this is Houston.

SC Roger, go ahead, Houston. Apollo 11.

CAPCOM Roger, we're going to go ahead and enable the S IV B for the slingshot maneuver. The LOX dump will start about 12 minutes from now, over.

SC Okay, LOX dump about, I guess that'll make it about 0.1 up.

CAPCOM All right, I'll try to give you a little closer update as we approach it.

SC All right.

CAPCOM And 11, for your information, the magnitude of mid-course correction number 1, if we burned it, looks like about 17 feet per second. We're presently considering not burning it. This would make mid-course correction 2 tomorrow about 21.3, over.

SC That sounds good to us.

CAPCOM Roger, you're looking good now.

SC We didn't have much time, Houston, to talk to about our views out the window when we were preparing for LM ejection but up to that time we had the entire northern part of the lighted hemisphere including North America, the North Atlantic and Europe and Northern Africa. We could see that the weather was good, just about everywhere. There was one cyclonic depression in Northern Canada and the Athabaska, probably east of Athabaska area. Greenland was clear and it appeared to

be, we were seeing just the ice cap in Greenland. All North Atlantic was pretty good in Europe and Northern Africa seemed to be clear. Most of the United States was clear. There was a, looked like a front stretching from the center of the country up across north of the Great Lakes and into Newfoundland.

CAPCOM Roger, we copy.

SC And I don't know what I was looking at, but I sure did like it.

CAPCOM Okay. I guess the view must be pretty good from up there. We show you just roughly somewhere around 19,000 miles out now.

SC I didn't have much outside my window.

CAPCOM We'll get you into PTC one of these days and take turns looking.

SC Houston, Apollo 11. We're, we've completed our maneuver to observe the slingshot attitude but we don't see anything, no Earth and no S IV B.

CAPCOM Roger, stand by. In GET I have a LOX dump start time for you. It's supposed to start at 5 plus 03 plus 07 and stop at 5 plus 04 plus 55. LH burn starts at 5 plus 37 plus 47, stops at 5 plus 42 plus 7. Over.

SC Roger, thank you.

CAPCOM 11, Houston.

SC Go ahead, Houston.

CAPCOM Roger. We now recommend the following attitude. ROLL 307.0. PITCH 354.0. YAW 019.5 and the LOX dump has already been enabled so we can't hold it off any longer.

SC That's okay. Go ahead. We'll maneuver around at 307, 354, and 19 ½. Thank you.

CAPCOM Roger.

CAPCOM 11, Houston. It doesn't look to us like you'll be able to make it around to this observation attitude in two minutes. We recommend that you save the fuel. Over.

SC Okay, Houston. We've, you got to us just a little late. Our maneuver's already begun so it's going to cost just about the same amount of fuel to stop it no matter where we stop it and we may as well keep going.

CAPCOM Roger, go ahead.

CAPCOM 11, Houston, LOX dump initiated.

CAPCOM 11, Houston, LOX dump has been terminated, over.

SC Roger. We still don't have the –

CAPCOM Roger, out.

CAPCOM Apollo 11, this is Houston, over.

SC Go ahead.

CAPCOM Roger, if you'll give us ACCEPT and stay in POO, we'll set your trunnion bias to 0 and I have a plan for balancing your oxygen cryos, over.

SC You got it.

CAPCOM Roger.

SC Houston, Apollo 11. We've got what appears to be the S IV B in sight only it has to be a couple of miles away. It's at our number 5 window and the dump appears to be coming out of two radially opposite directions from the S IV B.

CAPCOM Roger. They're continuing with the non-propulsive vent from the liquid oxygen tank. It would be radially opposite then. And boosters tell me, tells me it's the continuous vents system, they're also dumping a small amount of fuel at this time. You got about 23 ½ minutes or so until the APS burn. Over.

SC Roger.

CAPCOM 11, Houston. We have a recommended configuration for your cryo switches to even up the load between oxygen tanks 1 and 2. Over.

SC Okay.

CAPCOM You're coming in very weakly there. We're recommending O₂ tank 1 heater OFF, O₂ tank 2 heater to AUTO, O₂ tank 1 and 2 fans both OFF. H1, H2 tank 1 heaters to AUTO and H2 tank 2 heaters to OFF. Over.

SC Rog, we have that except the last one was H2 fans to OFF. Is that affirmed?

SC The configuration we have now is hydrogen heaters, we got 1 AUTO, 2 OFF, oxygen heaters 1 OFF, 2 AUTO and we have all the fans off.

CAPCOM This is Houston. Roger, we concur. Out.

CAPCOM 11, this is Houston. We've completed the trunnion zero bias setting. You can retrieve the computer and go to BLOCK.

SC Roger, I thank you.

CAPCOM 11, this is Houston. We're just maneuvering to view the slingshot. I guess we missed copying LM CM Delta P reading. Over.

SC Stand by, we'll give you a recent one. Right now reading 0.2, Bruce.

CAPCOM Roger, 0.2.

CAPCOM Okay, Mike, and could you verify that your waste compartment valve is in VENT then?

SC Roger, waste compartment valve has been in VENT for, oh, 45 minutes or so.

CAPCOM Roger, we copy.

SC If we're late in answering, it's because we're munching sandwiches.

CAPCOM Roger, I wish I could do the same here.

SC Don't leave the console.

CAPCOM Don't worry. I won't.

SC Frank doesn't like it. How is Frank today?

CAPCOM Oh, he's doing quite well.

PAO This is Apollo Control at 5 hours 22 minutes. We're back live now. The Delta-P you heard discussed is the difference in pressure between the LM and the Command Module, cabin pressure. Apollo 11 coming up on 22,000 miles distance from the Earth now. Velocity 12, 914 feet per second.

