Engle: OK, Bob, are you ready to start APU’s again?

NASA 1: Standby.

Engle: Helium shutoff valve is open and let me know when you want to start APU’s again.

NASA 1: OK, Joe, we’ll be doing it by the old list, at 9 minutes for the helium shutoff valve open and on to the starting of the APUs.

Engle: OK, helium shutoff valve coming closed.

NASA 1: Would you move the control surface a little bit to bleed off for the pressure on #2?

Engle: You bet! I’m still on external stable platform, Bob.

NASA 1: Right.

Engle: Inertial gages are 1000 on inertial speed. Slightly descent on 44,500 on altitude. Attitude looks good and $\alpha$ is reading OK now, still on external.

NASA 1: OK. Helium shutoff valve switch open, go ahead with the APU’s.

Engle: Roger. Shutoff open. Data is on. #2 APU coming on.

B-52: 9 minutes.

NASA 1: Leave the data off, Joe.
Engle: Understand data off. #1 APU coming on.

NASA 1: #2 first?

Engle: That's already fired up! Reset the generators.

NASA 1: Roger.

Engle: Engine reset. Hydraulic pressure are both about ............ Controls and flaps coming down on the ............

NASA 1: Roger.

Chase: All set. Flaps coming down.

Engle: Coming back up.

Engle: Coming up. Flaps up.

Engle: Circuit breakers are in.

NASA 1: Very good. Keep going, Joe.

Engle: Mixing chamber temperatures are -40 on #1 and #2. α is still reading good and β is about 1 needle heads off to the left.

NASA 1: Roger. Chase 3, is your fuel OK for this?

Chase 3: Yes, I have 3000 pounds.

NASA 1: OK.

B-52: 8 minutes, starting turn.

NASA 1: Roger.

Engle: Aux cabin pressure switch is on.

NASA 1: Roger. Russell, we'll use the same numbers on the lake check, 140 north and 50 east. What is your α now, Joe?

Engle: α looks good and I'm going through SAS check now.

NASA 1: Roger. Fire extinguisher was auto?

Engle: ........... and still is.

NASA 1: Roger.

Russel: Lube oil temp 115.

B-52: 7 minutes.

NASA 1: Roger. What is your α reading, Joe?

Engle: About 1.5.
NASA 1: OK.

Engle: SAS check complete. On HI and alternate SAS is on. Horizontal stab is ZERO position.

NASA 1: Very good.

B-52: 6 minutes.

Engle: On X-15 oxygen now and got 2600. Cabin altimeter is 3600 and blood pressure switch is still on. And my source tank indicated about 50, ammonia about 47. Going to pressurize.

NASA 1: Roger.

Russel: Platform is in specs.

NASA 1: Roger. Joe, we will not repeat the jettison check.

Engle: Understand.

NASA 1: 008, can you tighten up your turn just a little?

B-52: Roger. 5 minutes.

NASA 1: Roger, we will give you another check at 4 minutes, looks like we will be adding 15 seconds. Joe, we are going to skip the next 3, 4, 5 items. Are you on interphone?

Engle: Roger.

NASA 1: Go to radio.

Engle: I'm on radio now, how do you hear?

NASA 1: Read you loud and clear, how do you hear me?

Engle: Very good, how about that!

NASA 1: How about that!

B-52: Around 4 minutes, standing by, anytime check.

NASA 1: Roger, standby for 4 minute check. Joe, aux cabin pressure switch on?

Engle: Roger, it's on.

NASA 1: And we are at 4 minutes. Disregard that 4 minutes, we'll be another 15 seconds. 4 minutes now.

Engle: Roger, 4 minutes.

B-52: 4 minutes, crossing 212°.

NASA 1: Roger, standby to mark, Jack. Mark, now.

Russel: Got it.

B-52: 3 minutes.
NASA 1: Roger, 3 minutes.

Engle: Velocity is 950 and attitude looks good. #1 APU bearing is 80, #2 is 30. Roger.

NASA 1: Jack, standby to mark. Mark.

Russel: Mark.

NASA 1: 008, turn to 210°.


NASA 1: Joe, go ahead with your 2 minute point.


NASA 1: What's your $\alpha$ and $\beta$ reading now? $\alpha$ is reading about 1.5 and $\beta$ is 1 needle to the left.

NASA 1: Roger. Go to 212°, 008.

B-52: 212° and 2 minutes.

NASA 1: This is one minute.

B-52: Correction, 1 minute.

NASA 1: We're going on your count now, Joe.

Engle: Roger, understand, let's make it 45 seconds now. Going to prime.

NASA 1: Very good.

Engle: Ignition ready and precool. Igniter idle.

NASA 1: Roger, Joe. Your ready light is on.

Engle: 15 seconds, pump idle. ........ is 175 and manifold pressures look good. Check, Bob?

NASA 1: Roger, we have good readings.

Engle: OK, I'll see you in a few minutes, 3, 2, 1, launch!

Chase: Good lite.

NASA 1: Looks good, Joe. Everything looks real good, Joe.

Engle: OK, coming back to 1/2 g, my $\alpha$ is inoperative again.

NASA 1: Roger, pull it up. Your profile is looking good. You should be on $\alpha$ and just hold that now. Good profile, Joe. 66, 67, 68, pushover.

Engle: Pushover. Brakes coming out now.

NASA 1: OK, 88, 89, 90, hold your altitude now, Joe. Hold your altitude. About 5° on your theta. Pull it up just a little bit, looks real good. I'll give you the count on the shutdown but shutdown on your velocity.
Engle: Roger, shutting down now, I'm 4000.

NASA 1: OK. Speed brakes in. Very good profile, Joe. Turn right about 5° when you get a chance. Bank 5° if you can, Joe.

Engle: Roger, I'm turning.

NASA 1: Very good profile, Joe. Now start your turn back to your original heading. Left about 5° and you've got about 10 miles to come wings level. Hold your nose up. OK, wings level now all the way. OK, you've gone by Pilot Knob.

Engle: Roger, indicating 72 and about 3200 feet, going to land position.

NASA 1: OK. Little bit high on energy but not bad at all. You can start down and pick up about a -400 on inertial velocity. You're at Cuddeback and what's your velocity, Joe?

Engle: I'm about 2800.

NASA 1: OK, looks very good. Beautiful profile. OK, I think you can bring speed brakes in right now, Joe.

Engle: OK.

Chase: Coming on with your turn, Joe.

Engle: OK.

NASA 1: Engine master off?

Engle: Engine master off. Going to center stick.

NASA 1: OK, got the base in sight?

Engle: Rog.

NASA 1: Understand you did change your trim switch?

Engle: Yes, .......... it is operating.

NASA 1: OK, you should be going subsonic right about now.

Engle: Roger. I'm coming through .......... about 1.8 now. And I've got 350 indicated and about 35,000. Correction, about 33,000.

NASA 1: OK, go to jettison, Joe, and you should be crossing the highway now.

Engle: Roger.

NASA 1: He's at high key. Chase 3, he's at high key now.

Chase: Roger, I have him.

NASA 1: Do you have him in sight?

Engle: Coming through 30,000.

NASA 1: OK check your squat and flap circuit breakers in.
Engle: Roger, squat circuit breakers coming on, flaps are up, and circuit breakers are in.

NASA 1: OK, you got a good pattern. Have you picked him up, Chase 3?

Chase: Negative, Bob.

NASA 1: He will be turning on the downwind shortly.

Engle: I'm right up about north Eddy now, coming through 20,000.

Chase: I got you!

Engle: I'm decreasing speed now, using a little speed brakes.

NASA 1: OK, Joe, you can go back to pressurize.

Engle: Going to pressurize.

NASA 1: Give him an altitude check when you get to him, Henry.

Chase: Very well.

Engle: 10,000 now, Bob, 9000 now.

NASA 1: Roger.

Engle: Flaps coming down now.

NASA 1: OK. About ready for the gear?

Engle: Not yet.

Chase: You're about 15 feet high, Joe.

Engle: Right.

NASA 1: Gear.

Engle: Gear coming down.

Chase: And they're all down, about 3 feet, 2, 1, real nice!

NASA 1: Speed brakes out, Joe?

Engle: Yes, I have.

NASA 1: You can control it with rudder now. Move the stick over and see what happens to it.

Engle: I have it all the way over now, I'm indicating about 80 knots.

NASA 1: OK, that's about the end of it.

Engle: OK. Hold it down center pretty good.

NASA 1: How about that!
Engle: How about that! My heading is 180°. Zero on inertial climb. Velocity is zero now. X-15 oxygen is 1800. Flaps coming up, speed brakes coming back up, ball nose test. Data is off. Hydraulic pressures are about 3400. Peroxide pressure is 800. APU bearing temperatures, #1 is 100, #2 is 30. Low lite is not on. Mixing chamber temperatures are -30 and -30. Engine source #1 is 1800 and #2 is 1800. APU source is 21 on #1 and #2 is 24. Cabin source is 2250. Speed brakes coming closed and platform going off.