

ASTP (USA) MCL79/1  
Time: 07:16 CDT, 47:56 GET  
7/17/75

PAO A 16.1 foot per second burn. It's the NSR maneuver or coelliptic maneuver which establishes a constant differential altitude between Apollo and Soyuz to allow catchup. The overtaking rate will be approximately 1.85 kilometers per minute. The orbit at that time will be 113.7 nautical miles at apogee, 112.9 nautical miles at perigee. As Apollo spirals outward to overtake and go out to the orbital altitude of Soyuz, the final thrust toward Soyuz will take place at ground elapsed time 50 hours, 52 minutes, 59 seconds. It's the TPI or Terminal Phase Initiation maneuver, service propulsion system burn of 22 feet per second. It produces an interception trajectory when the line of sight of Apollo to Soyuz reaches 27 degrees relative to the local horizontal. The altitude or the orbit at the end of that maneuver will be 122.7 by 123.8 nautical miles or essentially the parking orbit of Soyuz spacecraft. Spacecraft communicator Dick Truly, will begin reading up the so-called pad data over the Vanguard in about 30 seconds for the first two of these maneuvers and NC2 and NCC. That is the second phasing and the corrective combination maneuvers. We're standing by for AOS Vanguard.

CC-H Apollo, Houston. You're low at the Vanguard for almost 7 minutes and I got 3 pads sitting here for you. We are going to update the NC2 final pad. That's the first one, page 1-12 when you're ready to copy.

CMP Okay, ready to copy.

CC-H Okay. Starting with NOUN 28. There's very minor change in this one. 048:31 four balls; minus 0250, plus four balls, plus four balls; 340, 047, 359; 0120, 0001, go ahead.

CMP NC2 final pad readback. 048:31 all balls; minus 0250, plus all balls, plus all balls; 340, 047, 359; 0120, 0001.

CC-H Okay. Good readback, Vance. Same page I want to correct the high gain angles a little bit. The pitch should be minus 30, minus 30, yaw of 154 - 154. When you get those, if you'll turn back and read me down the P52 data, I'd appreciate it and then we'll get the other pads.

CMP Roger. P52. Okay, stars 33 and 42; NOUN 05 was five balls; NOUN 93, plus four balls 5, minus three balls 19, plus four balls 6; torqued at 47:47:30.

CC-H Okay, Vance. I copied and while you're there, would you give me the data from the COAS line-of-sight determination on the right side there.

CMP Roger. Shaft 35959; trunnion 57448.

CC-H Okay, Vance. Copy. If you'll turn two pages over, on page 1-14 I've got an NCC preliminary pad.

CMP Ready to copy, Dick.

CC-H Okay. 049:15 four balls; plus 0346, minus 0050, plus 0046; 179, 036, 352, 0223, 0002; weight 32096; trims plus 069, minus 052; star check: star 37; 2698; 312, go ahead.

DMP Roger. Readback, NCC preliminary pad. 049:15 all balls, plus 0346, minus 0050, plus 0046; 179, 036, 352; 0223, 0002.

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Weight, 32096; pitch trim plus 069, yaw minus 052; star check 37;  
2698; 312.

CC-H Okay. Good readback. Turn the page again and  
I'll give you an NSR preliminary pad.

CMP Ready.

CC-H Okay. Starting with NOUN 81. Plus 0125, minus  
0029, minus 0114, 189, 296, 350; 0059, 0001, 06112. Weight, 31982;  
trims, plus 069, minus 052; burn attitude checks, star 04; 1759; 237.  
We've got little over a minute till LOS. Go ahead with the readback.

CMP Okay. NSR preliminary readback. Plus 0125,  
minus 0029, minus 0114, 189, 296, 350, 0059, 0001, 06112. Weight,  
31982, plus 6 - plus 069, minus 052, burn attitude star 4; 1759; 237.

CC-H Okay, Vance. You've got them all. There were  
good readbacks. The - we're about 30 seconds from LOS. Next acquisition  
is at the ATS at about 48 plus 22 so we'll see you there. You'll all -

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CC-H - You've got them all. They were good readbacks. The - we're about 30 seconds from LOS. The next acquisition is at the ATS, at about 48 plus 22. So we'll see you there. You'll also notice on that NSR preliminary pad - that the delta VC tail-off is 11.2. And that's what I was talking about earlier, about being less than 13.

CMP Yeah, okay. Thank you.

CC-H Okay. Real fine.

PAO This is Apollo Control. Loss of signal through tracking ship Vanguard, for the final time this morning. Next station will be ATS-6 satellite, in 14 minutes. Spacecraft communicator Dick Truly, during that pass, read up the final NC-2, or second phasing maneuver, data to the crew - a long string of numbers which are entered in what's called a PAD, or preliminary advisory data sheet, carried onboard. These numbers allow the crew to set up the attitude and the timing of the - and the magnitude - of each maneuver of the SPS engine. The preliminary PADs for NCC, Corrective Combination, and NSR, Coelliptic, were also read up. Those will be refined as further tracking is obtained, following the second phasing maneuver. The final PAD for the TPI, or terminal phase initiate burn, will be done during the next revolution, at a ground elapsed time of about 50:30 - after the burn is complete for NSR coelliptic burn and we receive some tracking on the results of that burn. 12 minutes away from ATS-6 satellite. This is Apollo Control at 48:09, ground elapsed time.

PAO This is Apollo Control at 48:21, ground elapsed time. Apollo spacecraft now within about 40 seconds from being acquired through ATS-6 satellite, for 55 continuous minutes of coverage. 10 minutes away from the first of today's - the rendezvous. Ignition at 48:31, exactly 10 minutes from now. 24.4 feet per second, service propulsion system burn. This maneuver will adjust the attitude difference between Apollo and Soyuz. We're standing by for AOS ATS-6 satellite.

CC-H Apollo, Houston, through the satellite. How do you read?

DMP Oh, five by. How do you read us, Dick?

CC-H Loud and clear, Deke.

DMP Okay.

CC-H Apollo, Houston.

ACDR Go ahead.

CC-H Tom, it looks to us - in looking at the CMC down link - that you've loaded your solution, and not the ground solution. It's - with regard to NOUN 81, delta V is in the CMC, and we want to be sure and burn the ground solution. We can either go back through the pre-thrust program real fast and load the PAD values, or talk about leaving some residual.

ACDR We'll go back and reload, even though we did it one time.

CC-H Okay. Why don't you go back through it again and

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check them and make sure that the delta V's are loaded per the PAD  
NOUN 81.

ACDR	Okay. We'll do P-30. Okay?
CC-H	Okay?
SPEAKER	Okay (garble).
CC-H	Yes.
CC-H	Yeah. And you'll reload P-30 as you go through,
if you needs to.	
CMP	Okay, we got her in.
CC-H	Okay, Vance. We're watching you as you go through
the program.	
CMP	Dick, we're at attitude and ready.
CC-H	Okay, Vance. Thanks a lot.
CMP	Roger.
DMP	Hey, they're all good.

END OF TAPE

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Time: 07:47 CDT, 48:28 GET  
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CC-H Apollo, Houston. We are right with you watching.  
The - the gimbal trim check looks real good to us.  
USA Okay.  
PAO Command module computer now in program 40; SPS thrust-  
ing coming up in about 2 minutes to this first burn this morning.  
CMP Okay.  
CC-H Okay. Residuals plus 4 balls, 10, and minus 4 balls  
two.  
USA Okay. Copy.  
CC-H Okay. It was a good burn. Burn jerked your TV cam-  
era around a little bit.  
CMP Okay.  
CC-H And what was the delta VC after the trim please?  
CMP Minus 12.9 on time and on attitude.  
CC-H Okay. Real fine. Thanks Vance.  
CMP Right.  
SPKR Eight, received; 5, GR, hold decrease, audio, 5 GR,  
hold decrease, AM off, back up.  
USA Soyuz, Apollo (Russian).  
CMP Soyuz, Apollo (Russian).  
PAO Apollo crew now attempting to establish VHF commun-  
ications with Soyuz.

END OF TAPE

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CMP Houston, Apollo.  
CC-H Go ahead.  
CMP Okay, Dick. We've got Soyuz in the sextant.  
CC-H Hey super. Have you got a good view of him Vance?  
CMP He's just a speck right now.  
CC-H Okay. As you know, we're really - we and the Moscow Control Center and a lot of other people listening are sure interested in how this rendezvous goes and how the Soyuz (garble) as you guys get closer, so just keep us advised.  
CMP Okay. Right now he's hard to distinguish from the stars except that the stars are moving relative to background and he is not.  
CC-H Roger that.  
CC-H Apollo, Houston. We can see you beginning to take marks here. I've got a couple of minor checklist changes in the rendezvous book. They're over on page 1-18 and 1-19. If anybody's got time here at this - while we're kind of quiet, I'd like to go ahead and get them in. Page 1-18.  
ACDR Go ahead.  
CC-H Okay. Tom they're - let me explain them to you first. They're additions to the VTR/DAC switch list over there on the right hand side of the page. And the reason we're putting them in is to - that Santiago pass is going to be very short and we're not sure ENCO can get in a command. So, what we want to do is to add to the VTR/DAC switch list on panel 181 we want the TV select to go to CM and we want the CM 1, CM 2 switch to go to CM 2. And then I've got another corrections on page 1-19.  
ACDR All right. On panel 181, TV select to command module and CM 1, CM 2 switch to CM. Over.  
CC-H Roger Tom. That's correct and on page 1-19 also on the right side of the page on the VTR/TV switch list, panel 181, we want both the TV select switch and the CM 1 switch to up telemetry center.  
ACDR Okay. How about getting that again Dick, please.  
CC-H Okay. Panel 181, TV select switch to up telemetry center. And also the CM 1, CM 2 switch to up telemetry center. And that's to be done at - in the VTR TV switch list.  
ACDR Okay. Readback, on panel 181, TV select up telemetry center and CM 1, CM 2 up telemetry center.  
CC-H That's correct Tom, thanks a lot.  
CC-H Incidentally Tom, during that last transmission, there was - there was a big squeal and (garble).  
ACDR Hello. Soyuz, Apollo. (Russian).  
SFE (Garble) Hello everybody.  
ACDR (Russian) Valeriy (Russian).  
CMP (Russian) Valeriy.  
SFE Hi to you, Tom and Deke.  
CMP (Russian).

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SFE Hello there Vance.  
CMP (Russian.)  
CC-H Apollo, Houston. Didn't mean to cut out Deke there,  
but we - there was a loud squeal there when I talked to you Tom last we  
want to make sure that that's your speaker box is off; it's probably  
feedback.  
SCDR (Garble).  
CMP Alexey, (Russian).  
SCDR Roger.  
ACDR Okay, Houston. Go ahead, you said there was a loud  
squeal.  
CC-H Yeah Tom. When I was talking to you befor Deke and  
Alexey started talking, there was a loud squeal feed - feedback when you  
were talking. I'm assuming that might be because that your speaker box  
is still on and it ought to be off.  
ACDR Okay. We'll check and see.  
CC-H Okay. Super.  
ACDR The one on the - -  
CC-H - - Why don't you - -  
ACDR The one on the docking module might possibly, but  
this one's off.  
CC-H Okay Tom, and I didn't hear the squeal that time so  
we'll go as is.  
ACDR Yeah, the one in the DM is on that's right. It  
shouldn't bother us here.  
CC-H Okay.  
ACDR (Russian.)  
USSR (Garble) Deke.  
ACDR (Russian.)  
USSR (Garble).  
ACDR (Russian)  
USSR (Garble) - -

END OF TAPE

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USSR (Garble)  
ACDR (Russian)  
USA (Garble.)  
CC-H Apollo, Houston. At about 45 seconds per the  
flight plan, we're going to go to a TV downlink mode through the ATS,  
and so I'll be dropping out in about 30 seconds. I'll give you a call  
when we're locked back up.  
USA Roger.  
DMP Okay, Dick. And we've got good comm with  
Soyuz on an AM.  
CC-H Roger, Deke.

END OF TAPE



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CC-H Apollo, Houston. We've got the TV picture now, Tom. And, we're go for voice. How do you read?

ACDR Roger. I read you loud and clear. How me, Dick?

CC-H We still have that squeal. I'm not sure where it's feeding back, but I am reading you but with a squeal in the background. Also, if you have the time I think it would - and you wouldn't mind putting a shade over that left hand side window, to your left, it would sure help the TV - yeah, that one.

ACDR Like that?

CC-H Yeah, if you could - a window shade over that window would improve the TV tremendously.

DMP Ya know, Dick, we left the speaker box on up in the DM. I don't whether that may be viging us the problem or not.

CC-H Okay. I think the squeal is primarily coming when Tom transmits. When you transmit it - I'm not sure we're hearing any, Deke.

DMP Okay.

ACDR (Soyuz, this is Apollo. We are ready to begin comm check on VHF AM. Are you ready?)

ACDR (Soyuz, this is Apollo. How do you read on VHF AM?)

ACDR (Soyuz, this is Apollo. How do you read?)

CC-H Apollo, Houston. One thing that you might check on the switches, Tom, about the squeal that's coming out of you, is the set up on panel 10. Make sure that the intercom and the S-band are both full decrease, since you're - we've got an intertie to that panel.

ACDR Okay, checking. Both are decreased.

CC-H Okay.

ACDR Intercom and S-band.

CC-H Okay. Thanks, Tom.

ACDR Okay. Is there any squeal now?

CC-H It a - it sort of comes and goes. That time I didn't think it was very bad at all. In any case, I can certainly hear you.

ACDR Okay. How do you read now, Houston?

CC-H I read that transmission loud and clear.

CC-H Apollo, Houston. I've got an NCC final pad. When you can copy, page 1-14.

ACDR All righty. I'm ready to copy.

CC-H Okay, Tom. Starting with NOUN 11. 049, 150, 480, plus 0342, minus

ACDR Start all over, somebody was cutting us out.

CC-H Okay. I think we are. Stand by 1.

SPKR (Comm check on VHF FM. I announce I will speak over VHF FM in 5 minutes.)

CC-H Apollo, Houston. Say again, please, Tom.

ACDR Okay. We were cut off by some interpret, some background line. Go ahead and give me the whole pad again for NCC final, please.

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CC-H                   Okay, Tom. I was waiting and see if we could find out where the problem was before I read it up to you, maybe we could get clear comm, hand on just a second.

CC-H                   Tom, that interference is probably on the VHF FM. On panel 9, if you'll turn down your FM volume to full decrease, you can probably can get rid of it.

ACDR                   Okay, Dick (garble.)

CC-H                   Okay.

ACDR                   Okay. It's really bad, Dick.

CC-H                   Roger. I understand, standby.

ACDR                   Okay. It's cutting in and out. Try to get your transmissions in between it.

CC-H                   Okay. Let me go ahead and start again with NOUN 11. And I'll try to break it up. 049, 15,04.80; plus 034.2, minus 004.3, plus 004.1; 179, 037, 353, 021.7, 00:02, readback.

ACDR                   Roger. 049, 15,4.80, plus 034.2, minus 004.3, plus 004.1; 179, 037, 353, 021.7, 00:02, over.

CC-H                   Okay, Tom. Good read back. Okay, turn the page. I've got a final NSR pad for you.

ACDR                   Go.

CC-H                   Okay. Starting with NOUN 81. Plus 0130, minus 003.1, minus 013.6; 189, 299, 351, 006.1, 00:01, 0.8,0 - correction, delta VC tailoff 13.0, go ahead.

ACDR                   Okay. Plus 013.0, minus 003.1, minus 013.6; 189, 299, 351, 006.1, 00:01, 13.0, over.

CC-H                   Okay, Tom, let me make sure - let me read you the last two again - the delta VC at ignition is 0.8, and the delta VC tailoff is 13.0. Did you read those back?

ACDR                   Roger. 0.8 and 13.0.

CC-H                   Okay, Tom. Good readback both pads, thank you.

ACDR                   Houston, Apollo. I think what's happening is you're getting feedback all the way through, back to Houston, back up on S-band. I've got AM and FM both off.

CC-H                   Roger, Tom. Thanks and we'll continue to look at it. When we figure it out, I'll get back to you.

ACDR                   Okay.

CC-H                   And, Apollo, Houston. We're going to be going out the TV down link mode, I'll be dropping out about 30 seconds. I'll call you back.

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ACDR Okay.  
CC-H And Apollo, Houston. We're going to be going out of the TV downlink mode. I'll be dropping out about 30 seconds and I'll call you back.  
DMP (Soyuz, this is Apollo. I'm ready for comm check on VHF FM.)  
USSR (Garble)  
DMP (Roger. Correct.)  
DMP (Soyuz, this is Apollo. VHF FM. How do you read?)  
USSR Apollo, Soyuz. I read you 3 by 3 on VHF FM.  
DMP (All right. I heard you 4 by 4.)  
CC-H Apollo, Houston. We're back up on air-to-ground.  
DMP Okay.  
USSR (Garble) VHF FM.  
DMP (Alexey, I heard you poorly just now. Maybe we will be better in 5 minutes. Soyuz, this is Apollo. I hear you excellently.)  
USSR (Garble)  
DMP (We to. We hear you excellently on the VHF AM and we'll try on VHF FM.)  
CC-H Apollo, Houston. We're going to do a (garble) here and drop out about 30 seconds. I'll call you back. Apollo, Houston. We're back up on the air to ground.  
CMP Roger.  
CC-H And also if anybody has a chance, on page 1-15 I've got an update of the high gain angle.  
USA (Garble) Okay. Go ahead, Dick.  
CC-H Okay. Left side of the page, down at the bottom, pitch minus 05, yaw 314.  
USA And we've got good agreement taking the CMC (garble).  
CC-H Good show.  
USA Okay. Pitch minus 05, yaw 314.  
USSR (Garble)  
USSR (Russian)  
USA (Russian)  
CC-H Apollo, Houston. We're a couple of minutes from ATS LOS. We're going to drop out just a short time and we'll call you at Guam.  
ACDR Okay. (Garble)  
USSR (Russian)  
ACDR Houston, Apollo. How do you read?  
CC-H Loud and clear, Tom. We're close to 30 seconds from LOS ATS. Go ahead.  
ACDR Okay. We're getting up to 3 minutes to the burn. Recheck (garble) bring me back through your S-band.  
CC-H Okay. I copied that. We're not real sure. It's probably some configuration problem we got but we'll find it.  
ACDR All right.

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PAO                    This is Apollo Control. Loss of signal through  
ATS-6 satellite. About a minute and a half until reacquisition through  
Guam tracking station. And ignition on the corrective combination man-  
euver should take place just about AOS time and we'll get a report  
from the crew on how that maneuver goes. 49:15 is the ignition time,  
ground elapsed time, that is. 34.1 foot per second.SPS burn. This  
maneuver will take out any dispersions in altitude and plane differences  
between the intended Apollo orbit as it overtakes Soyuz. We're standing  
by for AOS Guam tracking station in about a minute.

CC-H                    Apollo, Houston. Guam for 6 minutes.  
CMP/ACDR                Roger, Dick.  
USA                     (Soyuz, this is Apollo.)  
USA                     (Soyuz, this is Apollo.)  
USA                     (Soyuz, this is Apollo.)  
CC-H                    And Apollo, Houston. When you guys get squared away  
stand by for burn status report.

CMP                     Roger.  
USA                     (Soyuz, this is Apollo. How do you read?)  
ACDR                    Houston, how do you read?  
CC-H                    Loud and clear, Tom.  
ACDR                    Okay. Burn was on time. Burn status was - -  
CMP                     Okay. - -  
ACDR                    - - minus, minus (garble).  
CMP                     Right. Minus four balls, 1 minus four balls, 1 minus  
four balls 1. The EMS was set at 23.0 for the G&N solution and was turned  
out to 13.2 and it was on time, on attitude.

CC-H                    Okay, Vance. Copy.  
USA                     (Soyuz, this is Apollo. How do you read?)  
USSR                    (Garble)  
USA                     (Very good Valeriy. The MCC complete. Turn on your  
ranging please.)  
USA                     Soyuz, this is Apollo. Ranging now established.)  
USA                     (12 miles.)  
USA                     (12 miles.)  
USSR                    12 miles.  
USA                     (Valeriy, we've seen you through the sextant a long  
time ago.)  
ACDR                    Okay, Dick. We locked on them (garble) ranging at  
about 120.40 miles.  
CC-H                    Okay, Tom. Thanks a lot for letting us know.  
USA                     (Soyuz, this is Apollo. Turn on your ranging. How  
do you read?)  
USSR                    Say again, please. I did not understand you.  
USA                     (I'm talking about ranging.)  
USA                     (Russian)  
USSR                    I read you badly. 3 by 3.  
USA                     (Roger. Understand.)

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ACDR (Talking on the ranging.)  
CC-H Apollo, Houston. If someone is over close to panel  
3 I'd like switches thrown.  
ACDR Go ahead, Houston.  
CC-H On panel 3, I'd like the S-band normal power amps  
switch to low.  
ACDR Okay. Got it, Dick.  
CC-H Okay and we're about 30 seconds from LOS. I'll give  
you a call coming up at Santiago at 49:52. See you there.  
DMP Okay. And we've completed all of our COMM checks  
with Soyuz. The ranging isn't the greatest but we're getting their ranging  
data.  
CC-H Roger, Deke. Thanks.  
MCC-H CAP COMM INCO, MOCR 2.  
PAO This is Apollo, Control. LOS through Guam for the  
final time this morning. Next station in 30 minutes will be Santiago,  
Chile and ATS-6 satellite again. Crew reported that the NCC corrective  
combination maneuver was done on time and on the proper attitude. Also  
they're getting VHF ranging aboard Apollo on the closing distance with  
Soyuz and at LOS it was down to 117 nautical miles. We'll return in 30  
minutes as communications resume through Santiago and ATS-6. This is  
Apollo Control at 49:22.

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ASTP (USA) MC187/1  
Time: 09:11 CDT, 49:51 GET  
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PAO This is Apollo Control; 49:51 ground elapsed time; about 40 seconds away from acquisition at Santiago, Chile tracking station and AOS at Santiago coincides with ignition time for the NSR maneuver which is the coelliptic maneuver to establish a constant differential height between the Apollo and Soyuz as it spirals outward to overtake the Soviet spacecraft. The overtaking rate after this maneuver will be approximately 1.85 kilometers per minute. Standing by for AOS and ignition time. Zero should be burning at this time.

CC-H Apollo, Houston. Standing by.  
USA (Soyuz, this is Apollo. NSR completed.)  
CMP Houston, this is Apollo. We just finished NSR.

Residuals were all balls, plus all balls 1, minus all balls 1. EMS is reading minus 12.8; we shut it up on the G&N. And we burned the G&N (garble) solution; good attitude and on time. And we'd like to report that we could see Soyuz through the sextant shortly after NCC.

CC-H Okay, Vance. Would you read me the residuals again?  
I only copied two of them; if you'll give me those again, I'll have it all.

ACDR Roger. That's OY minus 1, Z plus 1. Over.

CC-H Okay, Tom. Thanks alot.

CMP Okay.

CC-H Apollo, Houston for Tom - Apollo, Houston for Tom, when he has a chance.

ACDR Go ahead.

CC-H Okay, Tom. Let's talk about the RCS budget here for a minute. You're looking - we're right on the nominal; you've got plenty of gas. In case you do have any problems, remember the PSM goes empty when it's reading about 7 percent and the red line on RCS for the quads is 35 percent.

ACDR Understand, Dick.

CC-H Roger. And Vance, I cut you out. Go ahead.

CMP Roger. I don't know if you've been using the TV camera and station at 11 - that's station 11, but everytime we make a burn, why it acts just like it's suddenly dropping to the floor; it turns sideways and we have to reset it each time.

CC-H Roger, Vance. Understand.

DMP (Soyuz, this is Apollo. NSR completed.)

SCDR I don't understand you, Deke.

DMP (Maneuver NSR completed.)

SCDR Yes. I understand.

ACDR Houston, Apollo. Do you have any different angles for the ATS than what we - used for the flight plan?

CC-H Yes. The pitch is minus 05; yaw, 314. I read them up but maybe get - they got in another book. Minus 5 and 0 - and 314, Tom.

ACDR Okay.

DMP Okay. I had it, Dick, and it's set up that way.

CC-H Okay. Super.

ASTP (USA) MCL87/2  
Time: 09:11 CDT, 49:51 GET  
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USA (Russian)  
SCDR A range is 18 - 8 miles.  
CC-H Apollo, Houston. We may have a short dropout between  
Santiago and ATS, but if we do we'll see you on the ATS.  
CC-H Apollo, Houston through the satellite. How do you  
read?  
CMP 5 by, Dick.  
CC-H Okay. Incidentally, on the comm, we have rechecked our  
configurations on the ground; they're all - they're correct now. If the  
problem of the comm interference happens again, one thing that you might  
try is to turn off the phone-mike interconnect switch on panel 10 and see  
if that cuts it out and let us - and then let us know about it; we'll  
continue to work the problem.  
CMP Okay. we haven't heard it lately, Dick.  
CC-H Okay. I'm hoping we have it corrected.

END OF TAPE

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Time: 09:26 CDT, 50:06 GET  
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CC-H Apollo, Houston. Per the flight plan. We're going to be switching over to TV mode so I'll be dropping out for a few seconds. I'll call you back.

USA Okay.

CC-H Apollo, Houston. Through the satellite again. How do you read?

USA Five by, Dick.

CC-H Roger. And I had one question for Vance in regard to the NSR burn. If he happens to remember it. Vance, do you remember what you loaded prior to the burn in that EMS for delta v?

CMP Stand by 1.

CC-H Okay. It's not something that you would normally would have written down in the rendezvous book and if you don't remember it, don't worry about it.

USA (Garble) on delta v-- minus 13 and it strikes us that it was 9.8 but I'm sure it was 9 something.

CC-H Okay. Copy. Thank you much.

CC-H Apollo, Houston. We got television down linking again. We still have light problems. Looks like when we readjust that the TV camera after the SPS burn, we may need to readjust the polarizing filter and also that hatch 3 window is drowning out a lot at the top. If you have time to put a cover over that, if you could stand to do that, we would appreciate it.

ACDR Okay. Stand by. We're in the middle of a slack period now. We'll take a look at it. I don't to knock out too much light coming up for rendezvous from the overhead. But we'll take a look at it.

CC-H We don't either. You do what's necessary. Just thought we'd let you know what the picture looked like.

USA Okay. Side window doesn't hurt us a bit over here.

CC-H Okay.

DMP Out the window. Our TV working down there, Dick?

CC-H Roger, Deke. I think what we are seeing is all ocean - well, I guess we're seeing the African Coast now coming up and it does look good to me.

DMP Okay --

END OF TAPE



ASTP (USA) MC189/1  
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CC-H Roger, Deke. Per the what we're seeing is all ocean - well I guess we're seeing the African coast now coming up and it does look good to me.

DMP Okay. It looks great from here. I didn't know whether you were seeing it that well or not.

CC-H Yeah. It just came into view. When you first asked me all I was seeing was water and I couldn't tell whether that was water or nothing.

DMP Okay. I'll tilt it over there a little bit.

CMP Marking is going real smooth Dick. The computer seems to really know where we are.

CC-H Good show. I'm glad to hear that and I got a TPI preliminary pad when somebody can copy on page 1-17.

DMP Okay. Stand by a second.

CC-H Okay. Whenever you have a chance.

DMP Okay. Go ahead Dick.

CC-H I'm sorry, you were cut out by somebody in here are you ready to copy?

DMP Roger. Ready to copy.

CC-H Okay. Starting with NOUN 37 050:56:42.61; plus 194, plus 006, minus 103; plus 21957, plus 00604, minus 00301; 0089, 0001; 359, 021, 000; 36, 130. And let me correct one. I think I read the NOUN 22 yaw incorrectly. It should read 001. Why don't you go ahead and read that back.

DMP Okay. 050:56:42.61; plus 194, plus 006, minus 103; plus 21957, plus 00604, minus 00301; 0089, 0001; 359. Okay, I changed you the next one. What's that, Tom.

ACDR Yeah. Okay. That's 021, 001 and 36, and 131.

DMP Try for 1.

CC-H Roger. That was a good readback. I didn't copy the last number which should be 13.0.

DMP Roger. 130.

CC-H Okay. The weight; - -

DMP We're getting all that racket again Dick and we're missing some of your transmission.

CC-H Roger. I'm hearing it too. The weight - I'll try to get in between it. The weight is 31914. And the trims plus 062, minus 047. Go ahead.

DMP Okay. Weights is 31914, plus 062, minus 047.

CC-H Roger. And the docking attitude pad on the next stage is nominal, no changes.

ACDR Hey, Dick?

CC-H Go ahead Tom.

ACDR Hello, Houston.

USSR (Garble)

ACDR Okay, relay through Moscow to Soyuz that every time somebody comes on with a various transmission our range is busting lock. Over.

CC-H Roger. We will do that.

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ACDR (Soyuz, this is Apollo.)  
SPKR (Garble)  
SPKR (Garble)  
SPKR (Garble) 1009. Clearence when you're ready.  
(Garble)  
SPKR (Garble)  
SPKR (Garble) 4004 and under control 12 -(garble)  
CC-H Apollo, Houston. While it's quiet. It was obvious  
to us that during all that noise there, that what we were hearing here  
was some sort of VHF tower interference - some control coming across  
Europe.  
CC-H And Apollo, Houston. Tom, if - I saw you trying to  
transmit I didn't here that I - I was watching TV.  
CC-H Tom, Houston. How do you read?  
CC-H Okay. Tom, Houston. I can see that you are reading  
me, but you're not transmitting down we'll look at the problem. I - I  
can see you're reaching for the mike on the TV. I know you're hearing  
me but I'm not hearing you - understand.  
SPKR (Garble)  
ACDR VHF keeps breaking lock.  
CC-H Roger. Understand Tom.  
SPKR (Garble)  
ACDR Okay, Dick. We must have got out of the area there.  
where all the transmissions - could hear it both in French and English and  
a little bit of Russian. Our tracker - our VHF is locked on good now.  
CC-H Okay. I hope it stays that way and I read that  
transmission loud and clear from you.  
ACDR Okay and they - the docking attitude lad is that going  
to be nominal.  
CC-H That's affirmative. It is nominal.  
ACDR Okay. I couldn't hear you when this other stuff came  
through.  
CC-H Okay.

END OF TAPE

ASTP (USA) MC190/1  
Time: 09:46 CDT, 50:26 GET  
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SPKR (Russian)  
CC-H Apollo, Houston. We're going to delete the downlink  
TV and go back to the air-to-ground voice mode.  
ACDR Okay.  
USSR Apollo, Soyuz. What is the range now?  
USA (Russian)  
SPKR 48 miles.  
ACDR (Distance 48 miles.)  
USSR Okay, I'm on docking; on time.  
ACDR (Okay. Roger. I understand you. GO for docking.)  
CC-H Apollo, Houston. When you have time to copy, Tom,  
I've got a final TPI pad.  
ACDR Okay. Stand by. I'll be ready - -  
CC-H Okay.  
ACDR Okay. Go ahead. Ready to copy.  
CC-H Okay. Starting with NOUN 37; 050, 59, 4348; plus 187,  
plus 011, minus 119, plus 22057, plus 01208, minus 02110; 0092, 0001, 358,  
013, 002, 39, 130. GO ahead.  
ACDR All right, on the readback. 050, 59, 4348; plus 187,  
plus 011, minus 119, plus 22057, plus 01208, minus 02110; 0092, 0001, 358,  
013, 002, 39, 130. Over.  
CC-H Roger, Tom. That's a good readback. And Tom,  
Houston. Be advised we have confirmed for sure that the interference  
here you've been hearing is interference from ground station. That last  
voice that was interfering just a few minutes ago was interpreted  
and it was a weather bulletin being - putting out. Must have been  
Moscow Metero(?)  
ACDR Okay. Thank you. The weather's pretty clear up here?  
CC-H Roger.

END OF TAPE

ASTP (USA) MC191/1  
Time: 09:56 CDT, 50:36 GET  
7/17/75

CMP Hey, Dick, did you see over recycle solution?  
CC-H That's affirm, Vance. We did.  
CMP (Soyuz, this is Apollo.)  
USSR (Garble) do you read me?  
ACDR (We read you well. Soyuz, this is Apollo. We now see  
your beacon. Some minutes ago.)  
USSR (Garble) beacon on.  
ACDR (All right, I see it now.)  
USSR Thank you very much.

END OF TAPE

ASTP (USA) MC192/1  
Time: 10:06 CDT, 50:46 GMT  
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CC-H Apollo, Houston. Tom, when you get a second, like to just talk about the various solutions as they are coming up.

ACDR Okay. You saw our TIG time; 50:56.

CC-H That's right, Tom. Just wanted to say a couple of words. We think you're doing real fine onboard; both the TIG's are slipping in the - the same direction; there is a difference between the pad TIG and the - and your onboard TIG. The one thing I wanted to say was if it did turn out that our's was correct, but you - because of the loading limits - you burned yours the first midcourse could be in the area of X about 9 and Z about 15 feet per second and we wouldn't be surprised if that - we don't think ours is right, we think your onboard TIG is right, so we don't think you'd have any problem at all.

CMP Understand.

CC-H Okay, Vance. We still have about 3 minutes here until LOS. I'll just make this LOS call from ATS and give you the call when we come up at Santiago at 51:26. See you there.

CMP Right-o.

CC-H Okay.

ACDR Do we still have contact, Dick? You can read that. It looks like we agree right on. At X, we're a little - oh, a half - about 1 foot per second - no, a half a foot per second; Y, within a little over 1; and Z. So we're right on - the times are there - we're home.

CC-H Roger. We're confident the way you are, Tom. Also, one thing before we go over the hill here; after we get ATS on this next pass and if this interference comes up and it's bothering you, let me let you know that it's not bothering me too much; so don't worry about me. But if it's bothering you so much you - we think probably you could get rid of it onboard by - on panel 10 going phone-mike interconnect to OFF and then whoever's being bugged on their audio panel, turn his VHF-FM and AM either OFF or volume full DECREASE.

ACDR Okay.

CC-H But, I can put up with it; it's easy for me to get in and out between that interference.

PAO This is Apollo Control. Loss of signal through ATS-6 satellite. Some 7 minutes away from onboard solution of the ignition time for terminal phase initiate at 50:56 ground elapsed time; the predicted time of burn, 22.2 feet per second which will thrust Apollo toward Soyuz for the final approach. As we come up on ATS-6 again, they should be in station keeping distance at between 20 and 50 meters. The Apollo now some 17 nautical miles below the orbit of Soyuz; after the TPI ignition, the Apollo spacecraft will actually overtake and pull slightly ahead by some 2000 feet, of Soyuz and then by braking, will match the velocity of the two spacecraft and approach from the forward - ahead of Soyuz; sort of a half loop maneuver. The rendezvous technique used in this mission was developed and perfected in project Gemini and used extensively in Apollo lunar landing program and the just completed Skylab program. During this last ATS pass over the Soviet Union, there

ASTP (USA) MC192/2

Time: 10:06 CDT, 50:46 GET

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PAO was VHF interference on the VHF very high frequency radio, apparently has been sorted out from Soviet Aviation Weather Service Radio. Here in the Mission Control Center, the Soviet Ambassador to the United States, Anatoliy Dobrynin is in the viewing room and has visited the Soviet flight control specialist staff support room next door. We'll return in about 34 minutes as Apollo and Soyuz station keeping 20 to 50 meters apart, come across South America. This is Apollo Control at 50:52 ground elapsed time.

END OF TAPE

ASTP (USA) MC193/1  
Time: 10:44 CDT, 51:24 GET  
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PAO This is Apollo Control. At 51: 24 ground elapsed time, we have some 30 seconds of air-to-air - that is, spacecraft-to-spacecraft - communications, that were recorded over Orroral Valley, somewhat scratchy and hard to discern what is being said. We'll play that back and go live across Santiago and ATS-6 satellite.

ACDR (Russian)  
USSR (Garble)  
ACDR (Russian)  
SPEAKER I was just experimenting - Deke, listen to me.  
ACDR Have him wired.  
CC-H Super, Tom.  
ACDR Mid courses were 2/10, 4/10, and the second one was a big one - like 6/10 and 8/10.  
CC-H Roger.  
DMP Okay, I've got it pretty well centered in my monitor, Dick.  
SPKR Okay. Good, Deke.  
CC-H Okay, good. This one is going on the VTR. We'll be picking it up - real time - shortly, here - over the ATS.  
DMP Okay.  
ACDR Starting braking, Dick.  
CC-H Roger.  
ACDR Less than 20 feet per second.  
CC-H Apollo, Houston. I've got 2 messages for you. Moscow is GO for docking. Houston is GO for docking. It's up to you guys. Have fun.  
ACDR All right. It sounds good. (Russian)  
SCDR Roger. 600 meters (garble) What is the range rate?  
ACDR (Russian)  
ACDR You can see his antennas from out here, Dick.  
CMP Yeah.  
CC-H Roger.  
CMP (Russian)  
USSR Thank you, Vance. Thank you, Vance.  
ACDR Going to the second braking gate now.  
CC-H Roger. And Houston is about 45 seconds from LOS at Santiago. We'll see you when you get locked up on the ATS.  
ACDR (Garble.)  
PAO This is Apollo Control. Apparently, the TPI maneuver was, indeed, successful. And Tom Stafford reported from Apollo that he was beginning the braking maneuvers to go into station - keeping with Soyuz, at from 20 to 50 meters' distance. Both control centers, Moscow and Houston, have given a GO for docking at the usual, or the flight plan, time. President Ford will place a call to the crew of Apollo and Soyuz, speaking to Tom Stafford and Alexey Leonov

ASTP (USA) MC193/2  
Time: 10:44 CDT, 51:24 GET  
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aboard Soyuz, after the first transfer has been completed. This will take place at about 2:30 central daylight time. We should be getting acquisition momentarily, through the ATS-6 satellite. And downlink TV at - is scheduled during this pass - of the actual docking.

END OF TAPE



ASTP (USA) MC194/1  
Time: 10:54 CDT, 51:34 GET  
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ACDR Houston, how do you read?  
CC-H Loud and clear, Tom. How me?  
USA (Garble.)  
CC-H Apollo, Houston. How do you read?  
ACDR It's loud and clear. How are you reading?  
CC-H Roger. Loud and clear, Tom. How are you doing?  
ACDR You should have a good TV picture.  
CC-H Okay. We're going to be starting the TV downlink  
here shortly.  
MCC-H Go ahead.  
CC-H Apollo, Houston. Panel 230. Need up telemetry  
switch to relay, if you haven't already done it.  
ACDR Stand by.  
CC-H Okay.  
CC-H Apollo, Houston. We've locked up on that data,  
now. We've looked at it. You're looking real good. We're going to  
switch over to the TV mode.  
USA Get a (garble) to bank. (Garble.)  
CC-H Apollo, Houston. We're - we do have the TV, now.  
Out the righthand window we can see the docking module and the Earth  
horizon.  
ACDR Can you see the Soyuz?  
CC-H Yes.  
CMP (Garble) in the docking module. And - -  
CC-H Ah hah! Here he comes, just above the docking  
module. Looks real pretty.  
CMP And - Dick - we have 2 lights SMR CS B and D.  
I think it's temperatures. No sweat.  
CC-H That's affirm, Vance.

END OF TAPE