TRANSCRIPT OF

APOLLO 13

FLIGHT DIRECTOR'S TAPE

APRIL 14, 1970

SPEAKER Tell me your site.

SPEAKER If you want us to.

SPEAKER Go for open circuit fuel cell too, right?

SPEAKER That's affirm, if he hasn't done it.

SPEAKER Five, ten.

SPEAKER Capcom flight.

SPEAKER Go, flight.

SPEAKER We okay there within, right now.

SPEAKER Okay. Open.

SPEAKER Disclose the react valves, flight.

SPEAKER Just close them. Just close the reacs.

SPEAKER _____

SPEAKER Yes. For those both PC's will be up in a minute.

SPEAKER Hurry up.

SPEAKER We just lost data in the building, JOhn wants the CP. Stand by. Tell me your flight.

SPEAKER Go flight. My problem next when I get around to it with you

SPEAKER guys is going to be what configuration ~~the~~ to power down to.

SEEAKER Roger.

SPEAKER At the present time, I'm thinking I'd like to keep the LM IMU up to the burn. We're up on the CP. But that's about as far as I've thought it~~s~~ through. Everybody's running power profiles and Jim McDivitt's people have a set of numbers right now.

SPEAKER Okay, Flight. We're working on it.

SPEAKER _____

SPEAKER _____ EECOMM are you all the way down yet?

SPEAKER We think the inverter went off,~~fligh~~t Flight. So he's in the process.

SPEAKER all right.

SPEAKER ~~Ye~~ We _____

SPEAKER Happy, Capcom. Thank you.

SPEAKER Okay. Look, gentlemen. We - Good LM data? EECOMM? _____

SPEAKER That's affirmative, Flight.

SPEAKER Here it is.

SPEAKER Yes. We have it.

SPEAKER Flight _____, we got a problem.

SPEAKER We going to have good data here for a while?

SPEAKER In and out flight. We got a different problem. By turning of the CSM, we end up without any good tracking data. There's not way we can get any tracking data. That LM data is biased because of the uplink shift and data ~~sle~~ select can not use that tracking data. Consequently, somewhere in here, we're going to have to bring up some kind of tracking on the CSM again.

SPEAKER~~Fido~~, Fido, Flight.

SPEAKER Go, Flight.

SPEAKER Would you figure that out?

SPEAKER Roger.

SPEAKER We're well clear now. The moon, right?

SPEAKER Roger that. As far as we can tell, we are] Flight.

SPEAKER And we need - Why can't we track ~~this land?~~ the LM?

SPEAKER[_____

SPEAKER Prior to the LM interferences, are you interferenced?

SPEAKER That's right. Because we had a bias off the up frequency to change the downlink and it's biasing the data and the data is no good._____

SPEAKER Is it possible to go back to the original and just leave this - -

SPEAKER We already tried it, Flight.

SPEAEKR It didn't work, huh?

SPEAKER We've tried it already. It doesn't work.

SPEAKER Okay, Ed. Thank you.

SPEAKER Okay.

SPEAKER Okay, everybody. Look. We've got a number of long range problems right now. We have the burn to do, which is about 79 hours, 28 hours from now and that's one business. We have to get the track up as we need it to take care of that burn.

SPEAKER Hopefully, we won't need to do too much ~~wti~~ with that, although I don't know how many amps that's going to take. However, right now, I want to be sure we get the whole situation stabilized with the LM and the CSM. We got to start bringing the LM power down some and getting the nonrequired stuff off the line so that we don't use ~~y~~ up any of these amp hours that we don't need to give away. And I want you to pay attention to the configuration we're currently in and get the people off line working on the longer range problems, especially the life boat problems now associated with the LM. You know. LiOH, et cetera. Let's get all that figured. But right now, I ~~wasn~~ want the guys here in the room to concentrate on keeping this thing right now going along ~~ri-~~ all right and watch it. All right.

SPEAER Flight, Capcom.

SPEAKER Go ahead.

SPEAKER Okay. My gyro torquing angles still good?

SPEAKER Guidance, are those gyro torques still good?

SPEAEKR Roger, Flight.

SPEAKER And the crew wants those?

SPEAKER roger. We ought to go ahead and final line that platform.

SPEAKER There you go, Capcom.

SPEAER Okay. And on these - Fred asked the question - He'd like to pull some circuit breakers on displays and have us watch them. Is he clear to do that?

SPEAKER Control and Telmu.

SPEAKER Go ahead, Flight.

SPEAKER You got good data there and we can pull the display circuit breakers in the cockpit?

SPEAKER Roger, Flight. Affirmative.

SPEAKER Okay.

SPEAKER Yes, Jack.

SPEAKER I want you to tell me what circuit breakers to pull and I want them defined as to panel and so forth just like we do in TCP.

SPEAKER So there's no misunderstanding. Okay?

SPEAKER Control?

SPEAKER Yes. We copy.

SPEAKER Why don't you get them Telmu?

SPEAKER That's activation 40, Flight.

SPEAKER Activation 40, Check.

SPEAKER Okay, Flight. Do you want them to proceed with IMU final line as outlined on page 40.

SPEAKER Guidance?

SPEAKER Roger, Flight. That's what we want them to do.

SPEAKER Affirm.

SPEAKER Telmu, Flight. Did you come up with those circuit breakers labels?

SEPAEKR Flight, we're working on it right now.

SPEAKER What do you mean? Don't you know what the circuit breaker numbers names are?

BPEAKER Yes. Ther's a whole slew of them. What we're going to do is just give you a page of them with - -

SPEAKER Oh, okay.

SPEAKER - - breakers open circled.

SPEAKER Okay. I'm looking for panel system breaker name. _____

SPEAKER Yes. They're going to give you a picture of the panel with the circled - -

SEPAKER We'll just give you a picture with the breakers circled.

SPEAKER Beautiful.

SPEAKER Do it just like PTC at the Cape.

SPEAKER Telmu, Flight.

SPEAKER Go, Flight.

SPEAKER While you're doing that, have somebody else figure out what we might take off here to save some current.

SPEAKER Okay.

SPEAKER Control, same with you.

SPEAKER Go ahead, Flight.

SBEAKER Same with you. We're going to want to save some power here, so - -

SPEAKER Flight, we're working on it.

SPEAKER - - figure out some suggestions.
- -

SPEAKER Capcom, Flight.

SPEAER Go, Flight.

SPEAKER Jack, would you let me know the conclusion of whatever discussion you guys have about the alinements. When you get - come to one.

SPEAKER Yes, sir.

SPEAKER Thank you.

SPEAKER Okay. I'll wait until you - -

SPEAEKR Flight, Recovery. Did you call?

SPEAKER No.

SPEAKER Fight, Guidance.

SPEAKER Yes.

SPEAKER Okay. We'd like to have an E mode dump for the LM, Flight.

SPEAKER Okay.

SPEKAER And we're ready for it at the site.

SPEAKER Okay. Well, give them a little while here.

SPEAKER Flight, Telmu.

SPEAKER Go head.

SPEAKER Okay. We're ~~taek~~ tracking a little problem here on amps and O2 tank 2 - -

SPEAKER Guidance reminded me of that in a little bit.

SPEAKER Ascent tank 2 - -
"

SPEAKER Okay.

SPEAKER What is it?

SPEAKER Yes. The pressure is up higher than it should be. What we need to do is open ascent - -

SPEAKER Before you go through the valves, what are you trying to accomplish.

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SPEAKER We're trying to use the ascent tank 2 pressure instead of the descent tank.

SPEAKER Is it close to venting?

SPEAKER No. It ~~is~~ doesn't - it's not venting now.

SPEAKER Is it close to venting?

SPEAKER It can't vent.

SPEAKER Yes. Okay.

SPEAKER Unless it's broken.

SPEAKER Yes. Okay.

SPEAKER And it's not broken.

SPEAKER Okya.

SPEAKER Okay. What we're trying to do is relieve the pressure in that tank, so we want to close the descent 02 tank valve and open ascent 02 tank 2.

SPEAKER 2 tank 2. How high is it?

SPEAKER It's up to 901.

SPEAKER What's it at normally?

SPEAKER Around 830.

SPEAKER And you just want to use some of it and then we'll go back to normal - -

SPEAKER Yes. That's right.

SPEAERK - - configuration, huh?

SPEAKER Okay. Got that, Jack?

SPEAKER Okay.

SPEAKER Tank 2 looks a little high, so they want to use some of it.

SPEAKER Okay. I got that.

SPEAKER Ascent tank - -

SPEAKER Close the descent 02 and open ascent.

SPEAKER 02 tank number 2.

SPEAKER Number 2. Right.

SPEAKER Telmu, Flight.

SPEAKER Go ahead, Flight.

SPEAKER Is it a good kd idea to close the descent 02 valve now?

SPEAKER Yes. It's okay.

SPEAKER You have to go that way, Flight.

SPEAKER Yes. I know that, but I'm worried about it come back open.

SPEAKER Okay.

SPEAKER Okay. We copy.

SPEAKER Flight, Control.

SPEAKER Yes.

SPEAKER _____ out here, we are drifting around here on this middle gimbal angle and he's in min impulse right now and I'm assuming that's where he wants to be, If he doesn't watch it close he can get himself in a gimbal lock again real easy. He's not in an automatick hold mode right now. He's in a drifting flight mode.

SPEAKER Yes. He may be looking for stars. That'might be what you're talking about.

SPEAKER Okay. That might be worth a confirmation. Okay. He knows he's in there because he's hitting the ACA right now.

SPEAKER Okay.

SPEAKER Okay.

SPEAKER ~~Oka~~ HOw's he doing on the middle gimbal?

SPEAKER Okay.

SPEAKER All right. Is he away from it?

SPEAKER Yes.

SPEAKER Okay. Well, keep your eye ønø it, Hal. It's good - -

SPEAKER Okay.

SPEAKER Just sing out if you think he's getting close and we'll pass it right up.

SPEAKER Roger.

SPEAKER Flight, Control..

SPEAKER Yes.

SPEAKER When you get a minute, I got one little item here.

SPEAKER Okay. How ~~em~~ many amps are we taking out there. Stand by.

SPEKAER Okay.

SPEAKER Control, do you have something for me?

SPEAKER Yes, sir. When we pressurize the RCS here, we noticed we got some - about a 5 psi or so change in the ascent ox and fuel tank pressures and it increased. Okay? We noticed that shortly thereafter. And what we'd like to do is to make sure that they've got the ascent feed ~~that make sure that they're~~ valves _____ seated in the close position. And when they get time, it'll close to circuit breakers and cycles which is for us to the close position and be sure they are closed.

SPEAKER Would you write down the procedure and bring it over, please.

SPEAKER Roger. Okay.

SPEKAER They're talking about ~~the~~ display circuit breakers right now. We'll let that get settled.

SPEAKER They're having to go up and look up some data books, but how

SPEAKER about stowage-wise, Flight? We have to worry about passing some gear back and forth, maybe FAO ought to think about that.

SPEAKER _____ FAO, you got people working on that?

SPEAKER Say again, Flight. Working on what?

SPEAKER Stowage, what might want to get passed to the LM or from the LM to the CSM.

SPEAKER Okay. We will have it.

SPEAKER Flight, I've got - -

SPEAKER Flight, Capcom.

SPEAKER Go ahead.

SPEAKER Okay. I have this abort pad and I've got gimbal trim angles. A pitch and a roll. Are these the ones that were preset  or are we going to have to _____ these around?

SPEAERK The ~~present~~ preset ~~probably~~ ones probably were for undock. Let me check. Retro?

SPEKAER Retro? Flight.

SPEAKER Go ahead, Flight.

SPEAKER These LM DPS trims, are they different than the ones that are in the vehicle right now?

SPEAKER That's affirm. This is based on ~~deek~~ - -

SPEAKER Dock burn?

SPEAKER - - dock burn.

SPEAKER And the ones they have on board are undocked. Right.

SPEAKER That's affirm for PDI.

SPEAKER Okay.

SPEKAER Flight, Control. We got some updates on those trims.

SPEAKER Oh. Okay. Well, come on in with them.

SPEAKER Okay. I can give them to you right now.

SPEAKER This is a coordination problem on these gimbal angles and I guess we're going to have to think up a procedure to coordinate the setting of those angles.

SPEAKER Flight, Guidance.

SPEAKER Capcom, _____ I don't know what that means. Which gimbal angles?

SPEAKER That's affirm.

SPEAKER The DPS trim angles.

SPEAKER Yes.

SPEKAER OKya. They can't read them out on board or set them onboard. They have to run them and then have us verify down on the ground.

SPEAKER Yes. Well, we can watch them trim it. I'm not sure I know what you're akking me, Jack.

SPEAKER We're going to have to say torque it a little more and then we're going to have to say it's okay now.

SPEAKER No. They can trim it automatically. Then load it and run it through the program.

SPEAKER But we have to verify, because their's is just a time _____

SPEAKER Oh, yes. We can verify that number. And we're getting some new ones, so hold up on those aborts. Guidance, you called me.

SPEAKER Rog. Their middle gimbal angle is getting big, Flight.

SPEAKER Getting close?

SPEAKER About 60 degrees.

SPEAKER Capcom, have him watch his gimbal angle.

SPEAKER Okay. I think I hear him doing that. What do you want him to do. jUst roll it out.

SPEAKER Well, in case he hasn't ~~h=n~~ noticed it, it's getting ~~c~~close.

SPEAKER Could I get some people in the room to be quiet? Capcom is talking.

SPEAKER Capcom - -

SPEAKER Stand by, Capcom.

SPEAKER You didn't tell me he was talking.

SPEAKER We have nay on panel 16?

SPEAKER Control, Flight.

SPEAKER Go ahead, Flight.

SPEAKER Hope you got somebody working on the PTC procedure.

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SPEAKER Flight, we got one already worked out, but it's an AGS type procedure, Flight.

SPEAKER That's okay.

SPEAKER I'd say that. I'm not sure I mean that, but okay.

SPEAKER Got some angles?

SPEAKER Flight, Telmu.

SPEAKER Yes.

SPEAKER The Capcom read up the circuit breakers to open on that panel 11. I don't believe he turned and page over. There's some on panel 16 also.

SPEAKER Just a minute, Telmu. Retro and Control, Flight. The COAS angles. Do you have NA. Are they not - are there non available?

SPEAKER Retro, Flight.

SPEAKER Go, Flight.

SPEAKER What does this NA mean for the COAS?

SPEAKER Fido said it was "non available."

SPEAKER What do you mean, none available.

SPEAKER Not applicable. He said none available. You might check with

~~SPEAKER~~-- Fido if you want more clarification on it.

SPEAKER Guidance?

SPEAKER Guidance, Flight.

SPEAKER Go, Flight.

SPEAKER Don't you want to add a COAS star to this TC - - too, Capcom asked why not.

SPEAKER Why do we have to know which axis that thing's mounted along right now?

SPEAKER Okay. You don't have enough data to figure that out. Is that right, right now?

SPEAKER I don't know if he's got it mounted along the z-axis or the x-axis, Flight.

SPEAKER Okay. That's what I said. Okay.

SPEAKER Telmu, write down what you want us to do, please, on the ~~eu~~ circuit breaker. I didn't hear you last time.

SPEAKER Okay. The Capcom only read one side of it. Citcuit breaker opening. We gave him a sheet. There's circuit breakers on panel 11 and 16 to open. He only read up one side.

SPEAKER He only read up panel 11?

SPEAKER Yes.

SPEAKER Okay.

SPEAKER Flight, Guidance.

SPEAKER Go ahead.

SPEAKER We can go ahead and compute one for along the z-axis and if it's not mounted there, they can move it and mount the COAS on the z-axis.

SPEAKER Okay. Go ahead.

SPEAKER Okay. We'll do that.

SPEAKER Control, Flight. You copying that?

SPEAKER Go ahead.

SPEAKER Just caught the tail end of it.

SPEAKER You see any venting anywhere?

SPEAKER Negative. Got a lot of this dropping in and out of data.

SPEAERK Okay. He's having some difficulty with it, so look for reasons why.

SPEKAER Roger.

SPEKAER 133 hours _____ to the Atlantic.

You might let them know we're copying the vox too, Jack.

SPEAKER Guidance, Flight.

SPEAKER We have a lodd, Flight, but EECOMM says we can't ~~land?~~ command.

SPEAKER Why not, _____?

SPEAKER We can command if we get a low bit rate.

SPEAKER We'll give them the numbers in the ~~puch-in~~.punch in.

SPEAKER _____

SPEAKER Pardon?

SPEAKER We'll just give them the numbers to punch in.

SPEAKER We'll read it up to him, Flight.

SPEAKER Yes.

SPEAKER Flight to Control.

SPEAKER Yes.

SPEAKER Okay. I got this list of stuff here for this ascent feed.

SPEAKERQ Okay. Bring it over. Have somebody hand it over.

SPEAKER And, Flight, did we dome up with something regardless to his upling and the time?

SPEAKER Weill have trouble uplinking the time. We'llhave to go to low bit rate. Can you easily punch it in the DSKY there, Guidance.

SPEAKER Flight Procedures, Guidance.

SPEKAER Can we see the DSKY?

SPEAKER Stand by on that, We're trying ~~t~~ an uplink mode that might give us command in voige and high bit rate.

SPEAKER Okay. ~~Did~~ Capcom, Flight.

SPEKAER Go.

SPEAKER For your information, the problem is that ~~we have~~ we've ~~to~~ had to deviate some of the frequencies because of the proximities

SPEAKER of the IU frequency and that thing is still alive. You copy?

SPEAKER Okay.

SPEAKER And that's - it's a little nonstandard in that regard.

SPEAKER Okay.

SPEAKER But they're seeing what they can do. Why don't you give them a g.e.t. hack _____ and let them know we're reading that vox.

SPEAKER Flight Procedures.

SPEAKER Go ahead.

SPEAKER Roger. We're in a command uplink mode along with voice and we've got high bit rate data.

SPEAKER Okay. Pull in data and we can give them a time. Wait a minute. Guidance, you ready to give them a time?

SPEAKER Roger, Flight. We got the load.

SPEAKER Okay.

SPEKAER We're ready to go, Jack.

SPEAKER Flight, Enco.

SPEAKER Go ahead.

SPEAKER He's got his updata link on.

SPEAKER Capcom.

SPEAKER Go ahead, Flight.

SPEAKER Flight Guidance, we got the load to go ahead and do it, now.

SPEAKER Flight, Enco.

SPEAKER Yes. I know. We got another problem. Go ahead, Enco.

SPEAKER I think it would be better if we go to forward OMNI on the LM now for this uplink.

SPEAKER You want forward OMNI?

SPEAKER Rog.

SPEAKER Capcom, Flight.

SPEAKER Hurry

SPEAKER Capcom, you need _____ TO get forward in OMNI in the LM.

SPEAKER I believe he's already done it, Flight.

SPEAKER Okay. Oh, it's already done.

SPEAKER Okay. And he's going to write a mission time - he's going to write a mission time into the LGC.

SPEAKER Can you do this and you'll have a DSKY? Time?

SPEAKER That'll give him his clock, will it REtro.

SPEAKER That's affirmative.

SPEAKER Okay.

SPEAKER Flight, Control

SPEAKER Go ahead.

SPEAKER Okay. If yall turn his inverters off, we can monitor his ~~mdd~~ middle gimbal angle here for him. One other suggestion I have -

SPEAKER Wait - wait a minute. Let me _____ COMM here _____

SPEAKER Flight, Retro, They got a good clodk update.

SPEAKER Okay.

SPEAKER Flight, Enco.

SPEAKER Go ahead.

SPEAKER If we get a chance here, we'd like to take and change our offset on the two vehicles on how we're getting this telemetry to try to~~se~~ solve this tracking problem. To do this, we're going to have to drop the LM uplink and break lock for maybe 5 ~~mi~~- to 10 - 20 seconds here.

SPEAKER Okay. Well, let's just stand by on that a minute.

BPEAKER Okay.

SPEAKER Okay. Now before we get into that one - -

SPEAKER Flight, Guidance.

SPEAKER Go ahead.

SDPEAKER We'd like to have that VERB 7~~5~~ sometime when they can _____ the DSKY.

SPEKAER Okay, Guidance.

SPEAKER Capcom, we're ready to a E memory dump. That'll give us a VERB 7~~4~~. That's what you're talking about, isn't it Guidance.

SPEAKER Rog, Flight.

SPEKAER We'll get an E memory dump.

SPEAKER Control, Flight. You saw an increase in that ascent tanks. Is that right pressure?

SPEAKER Yes.

SPEAKER And you want to be sure what - That the ascent feed are closed?

SPEAKER Yes. Close those breakers and cycle valves closed. Do not cycle to the open position, just to the closed position.

SPEAKER Yes. RCS. And we want to do an E memory, so whenever they can get around to it, we're all ready to receive it.

SPEAKE Okay. I got one item, Flight.

SPEAKER Say again.

SEPAEKR This is Control. We want to power down his inverters and in order to do that, we're going to ask him to look at his middle gimbal angle for him on the ground and to make it easier, he needs to get out of this min impulse mode, needs to go to PNGS, mode control to auto, when he gets to an attitude that he likes.

SPEAKER PNGS _____ Okay.

SPEAKER Now wait a minute. Before we do any of that, I want to ~~here~~ hear ~~what~~ what it is Control configuration we're going to be in and whether we're going to keep the PNGS up or whether we're ~~ein~~ going to bring the AGS up, et cetera.

SPEAKER Okay.

SPEAKER I want to get the hold start before we start doing more thinkg.

SPEAKER Roger.

SPEAKER Let me see if you've - Have you heard that one of the suggestions is to alinement the AGS to the PNGS, powere the PNGS down, use the AGS, then bring the PNGS back up and do a P52 for the burn.

SPEAKER That's right, Flight.

SPEAKER Okay. Well, I'd like to get that whole complex of control modes and what we're going to do and currents sorted out before we do start changing things.

SPEAKER Okay.

SPEAKER WE'll be doing this all night. Okay, Al?

SPEAKER Roger.

SPEAKER And I'm opening any suggestions here as to what the reason for course action. The last I heard from Stafford is they were going to try to run that again in the simulator, I believe.

SPEAKER Okay.

SPEAKER Flight Procedures.

SPEAKER Go ahead.

SPEAKER Roger. We're going to have to write a restart 10 second loss of data.

SPEAKER Okay, everybody. Stand by for a 10 second loss of data.

SPEAKER Yes. Control Flight? Hal? Control Flight.

SPEAKER _____ Go ahead, Flight.

SPEAKER Hal, Tom Stafford is coming over. Would you chat with him about this thing?

SPEAKER On the PNGS AGS?

SPEAKER Yes.

SPEAKER Rog.

SPEAKER Flight, Guidance.

SPEAKER Go ahead.

SPEAKER We got a good E ~~mod~~ mount, Flight.

SPEAKER Okay, Capcom. We got a good E mount. Do they need to terminate anything, Guidance? Or does it terminate.

SPEAKER No, it's okay.

SPEAKER It terminates. Okay.

SPEAKER And that's the Atlantic, too, Jack _____. That's the Atlantic.

SPEAKER Yes. We haven't made up our mind we want to go there, but that's the abort data he has on board.

SPEAKER It's the minimum return.

SPEAKER Yes.

SPEAKER Flight, Guidance.

SPEAKER Go ahead.

SPEAKER We'd like to send them a rest mat some time, Flight, if it gives POO and ACCEPT.

SPEAKER What kind of refs mat?

SPEAKER It's the one that they're alined to. They were turning one prelaunch and it's not the one that they're alined to right now. We're going to give them the right matrix.

SPEAKER Okay. And then what does he do? Aline TO it.

SPEAKER NO, no, he's fine. We just need to get it in there.

SPEAKER Oh, so he had it onboard.

SPEAKER Right.

SPEAKER Okay.

SPEAKER Capcom, are you ready to do that now.

SPEAKER Rog, Flight.

SPEAKER You want to send them a state vector, too, by the way?

SPEAER Negative. We want to hold off on that.

SPEAKER Okay.

SPEAKER I'm not sure what the LM will do with it. We're having MIT run the ~~high bybri~~ hybrid and ~~an~~ see what it would do with hhis kind of - -

SPEAKER Oh, that's right. Because it doesn't navagate out here.

SPEAKER That's right. So we're havėng to run it on the hybrid and

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SPEAKER REFS MATT. I'm not - Guidance, say one more time why you wanted to have a REFS MATTA Beaause he doesn't have one - -

SPEAER He doesn't have the one he's alined to right now, Flight. He alined to the PTC and he was - -

SPEAKER It's a minimum return.

SPEAKER Flight guidance_____. We'd like to send them a REFSMMAT sometime flight _____ gives POO and ACCEPT.

SPEAKER What kind of REFSMMAT?

SPEAKER It's the one that they're aligned to. They ~~r r r r r~~ were carrying one - ah prelaunch and it's not the one that they are aligned to right now. We're going to give them the right matrixs.

SPEAKER Okay, then what does he do? Align _____.

SPEAKER No, no, he's fine. We just need to get it in there.

SPEAKER Oh, so he has it on board.

SPEAKER Right.

SPEAKER Okay, okay, CAPCOM you're ready to that now?

SPEAKER Rog.

SPEAKER You want to send them a state back to two by - -

SPEAKER - - _____ we want to hold off on that. I'm not sure what the LM will do with it.

SPEAKER We have MIT run the hybrid and see what it would do with this kind of - -

SPEAKER Oh, that's right because it doesn't navigate out here.

SPEAKER That's right.

SEEAKER So we're having to run around the hybrid and REFSMMAT.

SPEAKER _____ say one more time why you want to have a REFSMMAT, cause he doesn't have one?

SPEAKER He doesn't have the one he's lying to right now, Flight. He'll aligned to the PTC and he's carrying another one.

SPEAKER Okay.

SPEAKER (Inaudible)

SPEAKER Yea, we want him to have the one he's aligned to.

SPEAKER And we're also going to stick a TFM in flight.

SPEAKER You want POO and DATA now, are you ready to go?

SPEAKER That's firm; we're ready.

SPEAKER Go ahead _____.

SPEAKER Rog, Flight, we're picking up.

SPEAKER position 9

SPEAKER Flight _____

SPEAKER Yea.

SPEAKER Could we try that procedure now?

SPEAKER Just a minute, Ed. Let me see what else is cooking - I don't have any reason why not to. Go ahead.

SPEAKER We don't have the DUA. He gave us POO, but he didn't give us the DUA.

SPEAKER Okay. We need that data position. Right?

SPEAKER Rog.

SPEAKER CAPCOM, CAPCOM flight.

SPEAKER We got programs zero zero but he needs to go to data first to get the load in.

SPEAKER Okay. We're loading the REFSMMAT.

SPEAKER That's probably what it is, Flight.

SPEAKER Okay.

SPEAKER Yea, he'll have to.

SPEAKER We've got it flight.

SPEAKER Okay.

SPEAKER We're picking up flight.

SPEAKER Okay.

SPEAKER Okay. We're loading the REFSMMAT; we've got to VERB 74.

Control flight did you see them cycle the valves on ASCENT feed?

SPEAKER Do what?

SPEAKER Did he cycle the valves on ASCENT feed. Jack says he did it.

SPEAKER Okay. We can't see that he did it flight - but he did do it.

SPEAKER Okay. Fine. Thank you.

SPEAKER _____ cycle the ascent feeds

SPEAKER Okay, now we're working on what we're going to do with the configuration. We need to get some kind of PTC going for us here and we need to decide what we want to do with our controd configuration. You're working all that _____ control?

SPEAKER Trying my best to flight.

SPEAKER Okay.

SPEAKER Flight _____ we're coming up on _____

SPEAKER You want to switch now?

SPEAKER Right.

SPEAKER We're right in the middle of a load.

SPEAKER Okay. We'll hold as long as we can.

SPEAKER He got it pretty quick awhile ago anyway.

SPEAKER Flight _____.

SPEAKER Flight _____.

SPEAKER Yea.

SPEAKER What's your command to the LM?

SPEAKER Through commanding CAPCOM.

SPEAKER _____

SPEAKER Yea.

SPEAKER I'd like to get going get that DUA off the line.

SPEAKER Okay.

SPEAKER What's you're commanding CAPCOM, they can take that circuit breaker, the DUA circuit breaker *off* out again.

SPEAKER And flight tell me -

SPEAKER Yea.

SPEAKER Ah, we'd like to get as much gear off here as we can. Like for you to think about turning this inverter off again here in a minute.

SPEAKER Which inverter?

SPEAKER The LM inverter. The inverter turning the 8 ball.

SPEAKER Yea, yea, I need to tie that together with however we're going to _____ this thing. Mer - -

SPEAKER - - Wait until you get this whole thing.

SPEAKER Understand but, ah - understand what you're saying.

SPEAKER Okay.

SPEAKER How many amps are we taking with that?

SPEAKER Well, we're pulling about 2 amps.

SPEAKER Okay.

SPEAKER Every little bit helps.

SPEAKER I know, I know, I agree with you.

SPEAKER Let me - ah, okay -

SPEAKER The water rate right now we're pulling about 7 pounds per hour

and the current capability is about 34 hours. Descent water.

SPEAKER Say again.

SPEAKER About 34 hours on the descent water at the present rate.

SPEAKER Oh, oh, okay. But we should be able to take the PGNS in the IMU off - -

SPEAKER That's right.

SPEAKER (Voice too low)

SPEAKER Okay. I'd like to get everybody up here a minute. Retro guidance, control _____ CAPCOM. ENCO and FAU. Is everybody on the loop? Give me a amber please.

SPEAKER Retro, are you up? Guidance, get a retro up in the loop please. Now look, as I see it, we've got a number of things to do. No big hurry right now. We got to maintain counter course with the LM, but we need to see what we need to do about setting up a PTC attitude in a range - in a control mode and what that means relative to the AGS and the PGNS configuration as to powering AGS down and etc. Now, Control, you're working that problem, right?

SPEAKER Right. Rog.

SPEAKER And I'm proceding now just staying put until we get that whole story put together. And how long is it going to take you do you think to come to some conclusion on that, Al?

SPEAKER I don't have an answer right now, Flight, we're trying to get it to you as fast - -

SPEAKER About an hour?

SPEAKER Yea.

SPEAKER Alright, so we just stand by on that. We are interested, though, in this and also from the point of view of the power configuration tell me I assume that you're working out all the consumable options and as soon as Control's got a mode here you're going to be able to lay out a power profile to tell us where we stand on all your O_2 and your water and your power, right?

SPEAKER But can you say something generally now? Generally we can come all the way home at 25 amps, right? On the LM.

SPEAKER No, not with this water usage right now, flight.

SPEAKER No but if we go down to 25 amps, that'll help us won't it?

SPEAKER Oh, I see what you're saying - 25 amps, not much.

SPEAKER No, that's not what I was saying much, flight.

SPEAKER Okay. Well, what do we have to get down to for example.

SPEAKER 15 amps or so. From the point of view of the water and then we got to get down that low. 15 do you think? Can we do that? And _____ support com mode.

SPEAKER Say again, flight.

SPEAKER We could be at 15 amps in a light support comm mode could we not?

SPEAKER That's affirmative.

SPEAKER Alright. Now we'll need to figure out _____ _____ right?

SPEAKER Right.

SPEAKER And on EECOM _____ if we have to get into that. I wrote a note up there that I don't quite understand. It says LM LI08 _____ 48 man hours and that doesn't sound quite right to me.

SPEAKER That's on the cartridge. Stand by _____ But _____ I'd like some people to start running consumables profiles out. Making a couple of different assumptions and not

standing by and waiting for everything _____ And please have somebody run it out grossly, you know, so that we continue to have at least 8 days even though it's not the most accurate one, you can continue to define it as you go along. I'd like that rather soon so to get some idea how we stand and what we're about to do _____, okay.

SPEAKER Okay, does anybody have any help besides thoses _____

_____

SPEAKER If we can get through _____ tracking data for FIDO, we hope.

SPEAKER If you'll let us drop the _____ from the LM for about 25 seconds. And _____

SPEAKER Right.

SPEAKER Okay. We'd like you to the crew _____ contact for a few seconds.

SPEAKER Okay. Let me go around and then we'll pick that up. Does anybody have anything else? Let me go around the room. _____ retro, data, _____

Control, you got anything ~~else~~ now?

SPEAKER Negative, flight.

SPEAKER Okay. __________? Okay, one second. Okay, I want to start hearing from you ________________ consumables.

SPEAKER Say again, flight.

SPEAKER I want to start hearing from you ____________________.

SPEAKER Rog.

SPEAKER Okay, you go back to ________________ flight.

SPEAKER Capcom, do you think of anything that we ought to be wokking on other than what was mentioned?

SPEAKER I didn't get all that you mentioned, but we are we working on bringing the AGS up?

SPEAKER Yea, that's a possibility you know. ___________ better do that for the PTC and do that time suggest here.

SPEAKER Well we could bring it up and have it there and it'd be a good idea to -

SPEAKER I don't -

SPEAKER Yea, I just don't want to use anymore power right now, or anymore water.

SPEAKER Okay.

SPEAKER As soon as we know as little more about what we really ought to do then we'll proceed to extend the consumables to do that.

SPEAKER Anything else that you can think of?

SPEAKER I'd like to have a little more information on the crew's trajectory relation of the moon that we could pass up.

SPEAKER Yes, _____ at the end of this go around we're going to have to stahdby for about 25 seconds.of that time lost while we do some reconfiguring in an attempt to get tracking on the LM. But we think it's so close _____

SPEAKER You're looking at about _____ flight.

SPEAKER 60 miles.

SPEAKER And this time thing we're going through is to kind of reestablish tracking on the LM. Right now we don't have tracking.

SPEAKER Okay, thank you.

SPEAKER You can go back in if you will. _____ do you have anything?

SPEAKER Yea, two things. We're figuring - looking at the fuel problem with _____ at one point of time we arrived at various

levels of fuel and we want a configuration. The other thing is then we some point of time would like to get that bound up swithh on in the LM. It's in the off position.

SPEAKER Okay. Okay, you want to go back in. _____

_____

SPEAKER Negative, flight.

SPEAKER SOL, you have anything you're working on stowage right?

SPEAKER That's _____ flight.

SPEAKER Any suggestions you might have as to what they might move to the _____ and _____ to the CSM.

SPEAKER That's right, we're working on that. I think it might be minimal anyway.

SPEAKER Okay. _____ go got anything.

SPEAKER I hope to have Honeysuckle up 210 by 52. Voice only. We hope to have them up by then.

SPEAKER _____ go got anything?

SPEAKER Negative, flight, present amplitude identified _)_____ on the Atlantic and in the ocean.

SPEAKER _____

SPEAKER _____ we need to start getting some data here on some of them gentlemen.

SPEAKER So let us spend our efforts to get that done.

SPEAKER Got to go, flight?

SPEAKER Yea, Capcom would you call the crew and tell them we're going to drop comm for half a minute here while we try to establish tracking. And let them know that I broke _____ at 60 miles right now.

SPEAKER _____

SPEAKER _____

SPEAKER Okay.

SPEAKER Got that Capcom.

SPEAKER Okay, I _____stow them. Go ahead, flight.

SPEAKER Thank you flight.

SPEAKER (Voices too low)

SPEAKER _____ in this configuration, are they going to try to burn?

SPEAKER What are they - what's their purpose?

SPEAKER (Inaudible)

SPEAKER Capcom, flight.

SPEAKER Go, flight.

SPEAKER As a matter of fact, Jack, why don't you let them know that we're currently, since it is so quite in here, trying to figure out what's the best configuration to do here relative to maintain control, maintain some kind of PTC. Staying in a _____ that we can do the burn properly and playing that against the consumables, and as soon as we get a reasonably good _____okay?

SPEAKER Okay. How about we getting the flight plan worked out, modified, and so forth.

SPEAKER We're working on that, flight.

SPEAKER Al's ~~for~~ working on that. And you might also tell them that we got Gene Cersen and the guys over there in the simulator checking stars, etc. in this configuration.

SPEAKER Okay.

SPEAKER And anything they would like us to run, we could procede to do it.

SPEAKER Alright _____

SPEAKER Can I - let me hear that _____

SPEAKER Okay.

SPEAKER Can we hear it?

SPEAKER We got to power down pretty quick.

SPEAKER Okay. Tell me about it.

SPEAKER Well, we recommend turning the power off, power amp off, going to low bit rate, getting this ac off and probably bring the AGS up in stand by.

SPEAKER Okay. What consumable _____ tell me.

SPEAKER Water and electriaal power.

SPEAKER Okay. Continue to relate some facts in here.

SPEAKER If I stay in the water the present rate, you only got 34 hours left.

SPEAKER Go ahead, power.

SPEAKER The power is 67 1/2 hours, flight.

SPEAKER Is that all ascent and descent?

SPEAKER Affirm.

SPEAKER At the present load, is that right?

SPEAKER That's right.

SPEAKER _____ I think we just need a - to get some things tied down _____.

SPEAKER Okay. Now what are you suggesting?

SPEAKER I'm suggesting power amp. Power amp and low bit rate. That's about 2 1/2 amps and the ac which is about 2 amps.

SPEAKER Well that _____ now we don't have anything, right? We don't have the data on the ground. Do you have IMU data on the low bit rate there, control?

SPEAKER All we have is _____.

SPEAKER Good enough.

SPEAKER You can watch it.

SPEAKER Yea you can watch the gimbal angle.

SPEAKER What control mode is he in now?

SPEAKER IN PGNS main _____.

SPEAKER So he's still flying it around.

SPEAKER Yes.

SPEAKER I think it's kind of difficult to talk them through isn't it?

SPEAKER He'll have to bring the ball up to fly on that thing.

SPEAKER Oh, my point a while ago was that if he goes to an attitude hold mode now other than flight mode, he'll hold the attitude he's in. You don't have to worry about it.

SPEAKER Oh, is that what you wnat to _____ tell me he's getting in a hurry here.

SPEAKER Well, I don't blame him.

SPEAKER What's going on with the COMM?

SPEAKER I don't know.

SPEAKER What else - tell me has he got anything else to suggest?

SPEAKER Ah, let me think, ah -

SPEAKER Contool flight.

SPEAKER Now how about you, what can you do to help. What do we need to do to decide whether to go to the ARS or not here.

SPEAKER Well, one item - -

SPEAKER Would it help with the star business and the simulator work.

SPEAKER Yea, plus _____ got in the span extrapulate the measured drift rate on this particular platform to see what it would look like when we got up to 79 1/2 hours.

SPEAKER Okay, but if we can see stars we can do a P52.

SPEAKER Yes, if you can see the stars and then that kind of falls out, you know. And as that - if you can do a 52 align, we definitely recommend to transfer the alignment to the AGS and turn the AGS on and turn the PGNS down.

SPEAKER Capcom, flight.

SPEAKER What are you getting out of the stars standing discussion?

SPEAKER Well the last thing I heard we that the sun light reflected off the thruster and made it so that they couldn't see it the stars and they also had a lot of debris still floating around with them, so they were unable - -

SPEAKER Couldn't see them out of what. Out of the window?

SPEAKER Out of the ALT.

SPEAKER Out of the window.

SPEAKER Have they tried the ALT yet, do you know? The reason I'm asking is that we're running low on water. I mean we're going to run out of water in 34 hours at the current power level.

SPEAKER How about going to low bit rate. The power amp off in the low bit rate. Control, can you do that now?

SPEAKER That's fine, flight.

SPEAKER Guidance, can you do that now?

SPEAKER Yes, flight.

SPEAKER _____ okay with you.

SPEAKER Say again, flight.

SPEAKER Okay with you if we turn the power amp off and go to low bit rate?

SPEAKER Well, why don't you let us get ourselves swung in here and see how we're going to work out with problem when - - procedure - -

SPEAKER Oh, oh okay, you're still in the middle of that.

SPEAKER Right.

SPEAKER Okay.

SPEAKER I don't have any COMM with them, flight.

SPEAKER _____ flight do we have no _____ right now.

SPEAKER How come?

SPEAKER We still - I thought that was only a PGN 30 second.

SPEAKER Flight, I don't khink he's got enough _____ right now.

SPEAKER Well, can we get one?

SPEAKER Yea, he's coming through right in that spot that I told you about

we're trying to force lock now and as soon as he's able, we'll get a call.

SPEAKER Okay.

SPEAKER Are we tracking yet, flight?

SPEAKER _____ going to power amps off on an omni and low bit - -

SPEAKER Wait a minute. The CAPCOM wants to know when we're going to have time. Is he coming back shortly?

SPEAKER I'll give you a call.

SPEAKER He'll be back shortly.

SPEAKER Okay, now the power amp.

SPEAKER If we turn the power amp off, go to low bit rate and stay in an omni till we get a down voice backup, we may be able to make it. It'll be very close.

SPEAKER _____ what.

SPEAKER Voice.

SPEAKER Up or down.

SPEAKER Both.

SPEAKER Going to be marginal. Like to give it a try though.

SPEAKER Okay, well let's finish up your test. Are you finished with that test now.

SPEAKER We're not quite finished; standby.

SPEAKER Find anything?

SPEAKER _____ and I'd appreciate your concern. Right now we're trying to get the COMM back. We kind of have to get an assessment of this thing to see whether we can bring the PGNS down now.

SPEAKER Okay, what about the ac? Still kicking that around?

SPEAKER Well, that's a problem. I don't know what we're going to do for PTC. I'm waiting for control without - we just can't sit there in attitude hold and I don't know about setting up a PTC in the LM.

SPEAKER Control, flight.

SPEAKER Are his attitudes moving around some?

SPEAKER He essentially fixed.

SPEAKER There seems to be static in attitude.

SPEAKER _____ moving just a little bit but not a heck of a lot.

SPEAKER _____

SPEAKER This ascent thing to pressure has gone back down to nominal value, we'd like to go back to the descent O_2.

SPEAKER Okay.

SPEAKER Close tank 2 and open descent tank.

SPEAKER Okay. _____ are we anywhere ~~back~~ near back in comm yet.

SPEAKER _____ if you just hang on a couple of more seconds then maybe we can get this thing square away so we can get the tracking data _____.

SPEAKER Understand amp.

SPEAKER No we're not, we don't have a good comm mode right now.

SPEAKER Capcom we you get comm back we can go back to descent O_2. You got that Jack?

SPEAKER Is it the same procedure?

SPEAKER _____ and control, flight.

SPEAKER Is somebody working me out a PTC PROCEDURE?

SPEAKER Yea, we're trying to get one put together. We got one for the AGS RIGHT now flight.

SPEAKER Okay.

SPEAKER Flight, control.

SPEAKER Go ahead.

SPEAKER It looks like we're getting it slowly here; we're just about there. As as you get it, we'd like to go to forward on the -

SPEAKER _____

SPEAKER _____ how may amps are we using with the LGC and the IMU?

SPEAKER About 12 amps total.

SPEAKER It's 10 amps, flight.

SPEAKER Okay, so we still have about 20 amps, huh?

SPEAKER Yea.

SPEAKER But - but they would be the big _____ items, wouldn't they?

SPEAKER Yea, that would improve the _____ picture a heck of a lot more than 30 percent.

SPEAKER Yea.

SPEAKER ENCO, can we talk yet?

SPEAKER _____

SPEAKER _____ is that right?

SPEAKER ENCO, have I got an estimate?

SPEAKER Say, let me tell you what's happened. While we're trying to lock it up we've twisted around to the forward OMNI country. So right now we're in forward OMNI. We got F selected and he doesn't know it because he had _____

SPEAKER So, if I can bear on your indulgence to wait until we swing all the way around to the F OMNI then we can get - -

SPEAKER We're not exactly swinging you know.

SPEAKER Yes we are - -

SPEAKER Are we? We moving arounnd?

SPEAKER We sure are.

SPEAKER Say, uh, like this. As far as you go like this.

SPEAKER Pitch.

SPEAKER Hoh, work _____

SPEAKER You're thinking about your roll.

SPEAKER Look at channel 32.

SPEAKER Yeah, okay _____

SPEAKER I don't know how to read that one.

SPEAKER _____

SPEAKER The part we are picking right now.

SPEAKER Pitching these parts, okay?

SPEAKER 60 degrees now.

SPEAKER Right _____. But wait a minute you guys have data? You should but - you sure we'll be able to get through in time?

SPEAKER CAP COMM, you should _____ you think we got the Comm now?

SPEAKER Give it a try and someone say forward OMNI if he _____ anything.

SPEAKER Okay, Capcomm.

SPEAKER Try it, _____.

SPEAKER Done.

SPEAKER Oh, come off a minute. _____

SPEAKER Check, say forward OMNI.

SPEAKER Capcomm, as soon as you uh get ahold of him. Would you get him to say what he wants to say about the star field and

SPEAKER (CONT'D) you can tell him to go back to the descent O_2. Control from flight plan, I'm becoming convienced that we don't have any choicekxx here, but that we got to go to some kind of AGS mode here. That's why I don't take any percision now. Okay, you getting it all written up?

SPEAKER I'm getting it. I already have the activation checklist.

SPEAKER Okay.

SPEAKER Written procedure - uh - procedure is available on these from control, for the AGS PTC and I think we run out of traces. We probably going to have to - -

SPEAKER Capcomm, you might try it now.

SPEAKER

SPEAKER: -- as soon as you get a hold of him would you get him to say what he
what he wants to say about the --------- and you g-- can tell

him to go back to the _____

SPEAKER---C-

SPEAKER Control for-- from Frank _____ I'm becoming convinced of

we aren't having any chance here beeause- but we have to go

to some kind of _____ here

SPEAKER That;s right I;m taking the procedure k- now

SPEAKER OK your getting it already- all weitten up?

SPEAKER I'm getting _____ check list

SPEAKER OK

SPEAKER A procedure is availabee on these control for the _____PTC

and I think we run out of choices we can probably can just

SPEAKER You might try it kkie- now

SPEAKER Have you got them yet

SPEAKER No, I havent got them yet

SPEAKER OK everybody here's _____

SPEAKER It's probably _____

SPEAKER Forward _____ and we need _____

SPEAKER OK

SPEAKER He is on and he has been on and the _____

SPEAKER OK what can we do?

SPEAKER OK let me try one more thing we'll be right with you

SPEAKER _____

SPEAKER _____

SPEAKER Look when we get them you get the other ____ business straighten out but tell them that we have to very soon decide to bring the _____ up and do things for that

SPEAKER _____ what are we getting?

SPEAKER _____ are we going to get combat ~~flight~~ I'm going to ~~get~~ knock off the track in here in a minute

SPEAKER That's flight run _____

SPEAKER That's right we're going back to the normal _____

SPEAKER Control your right

SPEAKER The close _____-

SPEAKER ok we've had _____ kind before can we get back to there?

SPEAKER Yeah thats what we're trying to do and we're not having any luck there's one suggestion we can do--- we can turn the limb transever off for about two or three minutes and let them grab a hold of the _____ push it out of the wy way and then bring it back up

SPEAKER Is that what we have to do now? We cant talk to them to let them do that

SPEAKER That right but if we can get ____ in here just say turn you _____ ov off for three minutes then turn it back on and I'll try to give you a call we if we get through

SPEAKER OK

SPEAKER What's the proper terminolgy 1 ____over there on the swithe- switch.

SPEAKER Do you want these transmitter reciever to aff on panel 12

SPEAKER In three minutes.

SPEAKER Do you want S-band transmittters receiver off.

SPEAKER Is Does that have our best step here, Enco?

SPEAKER Yeah

SPEAKER _____ does he have anything to say ~~abut-abut~~ about ____

and P52 yet?

SPEAKER NO, I havent heard any word I cant ask him any questions caz

he cant reach me

SPEAKER Yeah

SPEAKER _____ reconfigured yet?

SPEAKER Negative

SPEAKER How long?

SPEAKER No its not _____

SPEAKER _____ we have a two minute ~~ex~~ estimate

SPEAKER OK

SPEAKER Negative _____

SPEAKER It was us Jack

SPEAKER Who was the _____ refiguration?

SPEAKER _____

SPEAKER _____

SPEAKER AND flight _____

SPEAKER Go ahead

SPEAKER If he wants to try _____ since John been talking about it we can give an attitude _____

SPEAKER _____ FREquency just _____ half time time and they want be in there I dont think

SPEAKER Control _____ how you doing?

SPEAKER We're just about there_____following procedures

SPEAKER OK

SPEAKER _____

SPEAKER OK we can go ahead and get the time inpulse

SPEAKER I'm afraid to do anything right now until we have this discussion with them without _____

SPEAKER I sure do and I want to get it out as bad as you do

SPEAKER _____ right

SPEAKER Is there much of a difference to you that to operate on that-- ------- with the _____ down?

SPEAKER Water wise

SPEAKER Do you still want_____

SPEAKER Well it's ~~aeb~~ about 3 _____ but primarily the _____ do run a little cooler and youd be bring up a ~~k~~ new piece of gear so it would be a ~~d~~ifferent _____

SPEAKER I want to get ~~t~~- into this _____ and try

SPEAKER YEAH

SPEAKER s_____~~H-~~ ____ Jack

SPEAKER No he hasn't we cant even ask him a good ~~q~~uestion do you still want _____---

SPEAKER Through on the _____

SPEAKER No _____ flight

SPEAKER But your not going to get through

SPEAKER Flight income

SPEAKER Go ahead

SPEAKER Their having trouble grabbing the _____for me to push it out of the way is what the problem is

SPEAKER Enco, Flight. Is that our best step to get COMM back.

SPEAKER Enco, Flight.

SPEAKER Go ahead.

SPEAKER Is that our best step,now, to get COMM Back.

SPEAKER That's our best step, right.

SEPAEKR Capcom, give them that and we'll try.

SPEAKER He's not going to hear your _____ right now.

SPEAKER Control, Flight.

SPEAKER Go ahead.

SEPAKER Now how close are you to having this thing.

SPEAKER We're just - -

SPEAKER You're proposing an AGS PTC mode and _____

SPEAKER Well, we just got an input - What I'm getting to you with right now, is the procedure for turning the AGS and alining it to the PNGS so we turn the PNGS off.

SPEAKER Yes.

SPEAKER And that will leave us in an AGS attitude hold mode and I just got word from the _____ procedure that we had thus far for the PTC and AGS according to _____ it's not going to work and he's working tediously to get one that wi will. Just got that input.

SPEAKER You might be able to handle it without the PTC. Save the attitude that we ~~have~~ are now at and then just change attitudes over some time schedule.

SPEAKER Okay.

SPEAKER You recommend we simulate this procedure over in the LMS before we shape it up?

SPEAKER Which procedure? Jack.

SPEAKER What we're proposing is an AGS attitude hold that we change periodacally.

SPEAKER Since they don't have a PTC as such that works.

SPEAKER That's what I mean.

SPEAKER Yes.

SPEAKER _)_____ It'll give us a PTC and AGS and try the simulator first.

SPEAKER They -

SPEAKER _____

SPEAKER They don't have a procedure to get and PTC and AGS. They had one but it doesn't work.

SPEAKER We had one but somebody - somebody thinks it won't so we're not going to try it. Unless you want to try that one in the simulator.

SPEAKER Okay.

SPEAKER I would say no on that.

SPEAKER Enco, sing out as soon as you think we've got COMM over there.

SPEAKER Yes, sir.

SPEAKER Will you?

SPEAKER What are we doing now?

SPEAKER They're trying to bring up an uplink carrier to the LM so we can get some voice COMM.

SPEAKER Bring out the spped or whatever I've been doing down here

SPEAKER Say again

SPEAKER Bring out the speed or whatever I've been doing down here

SPEAKER Looking at a _____ in the presence time-range and on the ____ I've got now I'm looking at about 16 feet per second now to get pre returned

SPEKAER Yeah thats what i'm hearing of over hearing _____ Bill

SPEAKER ¥ And I've got the selects down there working on a _____ right now ~~theis~~ this is on the _____ ~~etu~~ out theree on _____ and we're not sure there could be any better than what we've got now so I guess what I've got to say is in about in 10 minutes I can ~~a~~ have a mavevour ready I'll be able to compute a manevour in time range 6~~5~~-30 and we can make a decision with that and it ought to be about 16 or 17 feet per second

SPEAKER OK it ~~prerefun~~ pre-~~t~~eturn so you can ~~weer~~ work with that no.

SPEAKER THANK YOU

SPEAKER _____

SPEAKER OK we ~~ahve~~ have a good Gn now and if we probably get a real good burn off now so go ahead and be doing it with this good GN and pre return

SPEAKER How long would it take you to get a free new ~~return~~ return manuivor could you get one at 61 hours

SPEAKER Roger that I can because its a question of what we want to do it on

SPEAKER Well get one as 61 as the best you have

SPEAKER Maryland how much water does it cost us to keep the ____ up for another hour Do we have an hour rate on it

SPEAKER Jack we have com

SPEAKER This ~~wei~~ will cost you ~~about~~ about 3 lbs of water

SPEAKER 3 lbs of water to keep it up another hour

SPEAKER Right

SPEAKER Of how many lbs

SPEAKER About 230 lbs

SPEAKER That seems to me to be worth it

SPEAKER OK

SPEAKER Yeah and let it power down and we'll let it drip and then we'll do what we want to tomorrow

SPEAKER OK but can we go ahead and turn on the power _____

SPEAKER What will that do to my com

SPEAKER Flight income

SPEAKER Go ahead

SPEAKER ~~Wel~~ We lost a good stand by

SPEAKER Jim we going to proceed to do a pre return maneuver here at a 61 hours asume that and as soon as we get com with the---- crew will see how they feel ~~aebutabu-abut-~~ about doing that Theres going to be ~~aebut~~about16 feet a ~~s--seeedn~~ second Jack We want to get out of pre return so we ~~ena~~ can get ~~pw~~ powered down and we'll still kick it at TC+2 if we can get everything back up in a line probably but with the way it is we want to get back on pre-return caz us an hours time here with the

the _____ powered up thats 3 lbs of water and we'll spend

SPEAKER OK

SPEAKER Now _____ get me a pad _____ and run a couple of them just in case we get behind on time here Guidance how do we need to burn this thing We dont have a ---- vector in there and its not going to be a guide of burn is it

SPEAKER Flight I'm going to have MIT run in _____ and see if it'll take a vector if it'll work alright

SPEKAER If it cant how do we do it

SPEAKER If it cant we'll do it in attitude _____ 247

SPEAKER OK

SPEAKER I think that's how we want to do it anyway

SPEAKER But we're going to look at the othere

SPEAKER ___ let me know we when we get com

SPEAKER Right

SPEAKER Inco what do you think my ~~chan-ge~~ changes are on getting my _____ back are shortly

SPEKAER It's starting to look a little better here flight

SPEAKER OK

SPEAKER _____ do you have an estimate on that pad

SPEAKER Say again flight

SPEAKER Do you have an estimate on that pad

SPEAKER 5 minutes flight

SPEAKER Thank You

SPEAKER And why your at it get why you get that ~~en-e-~~ one out run a couple more at 15 min. _____ run one at 64-45 and run one at 61-15 etc. OK But get the 61 hour one out

SPEAKER Control flight ~~ar-e~~ are you coping me

SPEAKER Go ahead flight

SPEAKER We're going to a little burn here ~~15~~ 16 feet a second and get back on free return as soon as we ~~an~~ can get ~~eomea~~ calm we're shooting per 61 hours

SPEAKER Roger guidance is doing something to see how the equations are going to work out but I'm _____ to ~~xxxxxxx~~ say we ought

to do it _____ PGNS. Consider that and consider everything else you want to think about and tell me any changes you would want to make. And, where we ought to pick up the checklist, et cetera, and let's refer to the - as best we can from the _____ books, Al. Tell them where to pick up from where they are now.

SPEAKER Roger.

SPEAKER Flight, Emco.

SPEAKER Go ahead.

SPEAKER It looks like you've got it.

SPEAKER COMM, Jack.

SPEAKER Okay, everybody. Let's be quiet. We have COMM. We've got a lot of business to do.

SPEAKER To figure something out.

SPEAKER After the _____.

SPEAKER We can give them another 15 minutes if - Yea, we can give another 15 minutes. Get a suggestion from him. We can figure it out

whenever he wants it. Get a suggested take time from him, Jack. What he's comfortable with. Yea, it's not going to cost us much water.

SPEAKER Flight, let's stand by on a take time.

SPEAKER 61.20. Is that okay? 61.25.

SPEAKER Okay.

SPEKAER That's right.

SPEAKER Okay, Flight. Have you got that take?

SPEAKER Go, Flight.

SPEAKER Flight, fine.

SPEAKER Affirmative. Affirmative.

SPEAKER Flight, have you got that take time?

SPEAKER Copy. 71 plus 30.

SPEAKER Proceed.

SPEAKER Okay.

SPEAKER Capcom. I don't think you ought to do any special maneuvering to find this out right now. Do you?

SPEAKER Don Don't talk him into that.

SPEAKER Okay, let's concentrate on the burn.

SPEAKER I didn't hear all of his question. John.

SPEAKER How much can he use of TTCA?

SPEAKER Fido, Flight. Have you got tracking? On the LM?

SPEAKER _____

SPEAKR That's affirm, Flight.

SPEAKER Well, okay. Well, are you seeing anything he's using as translation control or for attitude control with the stack. You understand?

SPEAKER I'll check.

SPEAKER And, are you seeing that in the trajectory?

SEPKER Or, have you got a good solid trajectory?

SPEAKER I'll check now.

SPEKAER G&C, Flight. Control, Flight.

SPEAKER Control here.

SPEAKER G&C.

SPEAKER Consider doing a 16 foot a second with the command module RCS. Service module RCS. Tell me what that means to me.

SPEAKER Flight.

SPEAKER Go ahead.

SPEAKER Okay. They wanted us to follow on the _____ om the 2R activation, and so I want some people standing by to go with it on OMNI.

SPEAKER Control, TELMU guidance.

SPEKAER Flight.

SPEAKER Go.

SPEAKER Stand by.

SPEAKER Stand by on the loop here. We're ⊠ going to go through activation.

SPEAKER Down through 1. Step 1 on page 1.

SPEAKER Flight, ENCO.

SPEAKER Go ahead.

SPEAKER I'd ~~like~~ like you to ask him to manage the OMNI's as he's talking.

SPEAKER Does he have his meters up.

SPEAKER Yea, it seems as though he still has that display breaker in so the meter must be up.

SPEAKER Okay. Let's go. He's got a - Ready to get this 2R activation done in one hour so we want everybody on the ball.

SPEAKER Okay, everybody. Quiet in the room, please and let's walk through with Jack on the activation. Everybody got their book out and ready to follow? Control, TELMU, guidance. Go, Jack.

SPEAKER Okay. We're on page 1 step 1. He's going to be talking back.

SPEAKER TELMU, Control.

SPEAKER Concur, Okay.

SPEAKER Control, TELMU.

SPEAKER Go ahead, TELMU.

SPEAKER Okay, we do not want inverter 1 closed.

SPEAKER You what?

SPEAKER Say again, TELMU.

SPEAKER We do not want invertor 1 breaker closed in step 5 here.

SPEAKER Okay.

SPEAKER Capcom, we do not want invertor 1 circuit breaked closed in step 5.

SPEAKER Do not.

SPEAKER And omit step 6.

SPEAKER And omit step 6.

SPEAKER Roger.

SPEAKER Flight, we recommend leaving the caution warning off.

SPEAKER Caution. Recommend that, huh?

SPEAKER He says recommend leaving caution warning off?

SPEAKER We got the time.

SPEAKER We got the time there.

SPEAKER You got it?

SPEAKER We got it.

SPEAKER Flight, Control.

SPEAKER Go ahead.

SPEAKER Okay, Okay, on step 1, did I understand he left the ED bit closed in the control? Breaker?

SPEAKER What is your question?

SPEAKER Did he close the empty control breaker under item 1, page 3?

SPEKAER Last entry.

SPEAKER I don't know.

SPEAKER Flight, Retro.

SPEAKER Flight, ENCO, we need to ask _____.

SPEAKER Flight, Retro.

SPEAKER Can you wait a minute, Retro?

SPEAKER Satisified, Control?

SPEAKER That's not it, Flight.

SPEAKER That's not it.

SPEAKER Past OMNI, Flight.

SPEAKER We need an aft on there, Jack. We'll lose COMM.

SPEAKER We got it, Flight.

SPEAKER Okay, Control.?

SPEAKER Rog.

SPEAKER Okay, you want xx the circuit - -

SPEAKER Okay. Copy.

SPEAKER That's good.

SPEAKER Break. Break.

SPEAKER Okay, have them x standx by right there, Jack. What is it Control?

SPEAKER Okay, on row 1, we need -

SPEAKER Circle x it and we'll get it at the end.

SPEAKER Okay, stand by. We have a comment. Control, you have a comment?

SPEAKER Yes, on row 1, DELTA gimbal under ac BUS A, needs to be closed.

SPEAKER Hey, there's a lot of breakers that aren't closed that we have called out in the checklist here. Do you want them to close all those txxxx that are outlined?

SPEAKER We'll catch the xx deck pile later on.

SPEAKER We'll catch that later.

SPEAKER We'll remind them of that later.

SPEAKER It's in the procedure.

SPEAKER It'll come up in the procedure later, Jack.

SPEAKER How about the rest of these breakers. You want them to close them and open them as they are outlined in the checklist here or are you going to have them hold off?

SPEAKER Looks like we're going to screw up our procedure if we dont' do it just the way it's outlined.

SPEAKER I didn't hear you, Jack. I was getting another input.

SPEAKER Yes.

SPEAKER Yes.

SPEAKER TELMU, Control. Do you want these that aren't closed to be closed?

SPEAKER TELMU, Control.

SPEAKER No.

SPEAKER Say again.

SPEAKER Negative.

SPEAKER Tell me, Control. How about you?

SPEAKER Negative from us, Flight.

SPEKAER Why are you saying that? Why don't we just do it by the book?

SPEAKER Well, that's the quickest thing in my mind to do is just do it by the book.

SpEAKER Well, why aren't we doing it?

SPEAKER Well, it may take a little more power than ~~xxkxk~~ what we - than what we got to spare.

SPEAKER Well, I'm going to spend that right now.

SPEAKER Okay.

SPEAKER You have review procedures?

SPEAKER Yea.

SPEAKER I think we'd better stick with what we know works.

SPEAKER We ought to stick with the procedure as written?

SPEAKER Yep.

SPEAKER I agree, Jack. Let's go ahead.

SPAKER You want me to tell them to push them in as on the -

SPEAKER As on the checklist?

SPEAKER I dont want to take any chances with this.

SPEAKER Okay, everybody, stick with them now. We're going to be moving over in the ~~x~~ next steps.

SPEAKER Guidance, Flight. I want ~~xx~~ you to have somebody looking ahead. We're going to ~~x~~ do this burn in P47. Right?

SPEAKER Right, Guidance. I don't think we can do it in 47. I don't think we have TPC control in 47.

SPEAKER What are we going to do it in?

SPEAKER Why don't you do it in 40?

SPEAKER Do we know it works?

SPEAKER ~~Wexk~~ We're having an MIT run it.

SPEAKER We have to get then the vector up? Do we?

SPEAKER That's affirm.

SPEAKER I don't really care for that. It's all we can do?

SPEAKER Well, we haven't cut the control yet. We can use the AGS possibly.

SPEAKER The AGS? They are not up.

SPEAKER The AGS are not up, and it's strictly a manual operation. That would be even worse than 47.

SPEAKER The procedure is written is called for P40

SPEAKER Yeah

SPEAKER The _____ Jack is the concern computer with the funny execto we have to verify we see

SPEAKER Yes

SPEAKER Leave your _____ in ~~i~~

SPEAKER Yes

SPEAKER _____go flight when will the answer come in that this is ok when are you going to put a vector in and etc.

SPEAKER Well, when ____ schedule right now for 61-30

SPEAKER Yes

SPEAKER Ok we've got a ~~vae~~ vector now and we can go ahead and lets stand by and see if we can get an answere here in the next few minutes MIT suppose to get under _____ right now

SPEAKER OK when am I going to get the answer. Did they know ~~they~~ that I need it and in about 10 or 15 minutes

SPEAKER Yes

SPEAKER They know you d need it

SPEAKER Alright

SPEAKER Ok now we can go through this list and see if there are a couple of odds and ends we can h yank out like the tape recorders he suggest

SPEAKER OK with the tape recorders _____

SPEAKER Roger any others like that

SPEAKER Anything wlse that is self _____

SPEAKER We recommend opening the _____radar heater

SPEAKER They're already open

SPEAKER And the LDC

SPEAKER Excuse me Lanny

SPEAKER Yeah, that's open too

SPEAKER OK now all we got is the recorder Jack we good it out that all the others are ok

SPEAKER OK

SPEAKER Control Flight

SPEAKER ~~Whitl~~-- While your doing it could you have ~~the~~ somebody work with Guidance on even without __ if we trim this ____ right and don't _____ 40 feet a second we ~~outh~~ ought to have a pretty good control burn

SPEAKE That right ____ problem in case this thing fromMIt e-e comes out negative

SPEAKER OK are you talking about doing ~~in-ti-47-~~ it in 47

SPEAKER Yeah ok

SPEAKER How ~~abut aebut~~ about _____ do you want that ~~ef~~ left off

SPEAKER OFF

SPEAKER Open

SPEAKER Negative

SPEAKER Negative

SPEAKER Leave it opena and we'll call for that when we ~~aan~~- want it

SPEAKER Procedure flight

SPEAKER GO ahead 61-30

SPEAKER Your squeeking

SPEAKER _____ going back over the panel ____

SPEAKER Control ___ Guidance Look ahead on this little thing and tell me what you want to be delited

SPEAKER Negative on the PQGS stand by

SPEAKER Negative on the PQGS we're checking ~~on~~ ____

SPEAKER A negative on the ____ and how about the system on the _____ plan

SPEAKER Cross points negative

SPEAKER Roger

SPEAKER You said no didnt you

SPEAKER Negative

SPEAKER Negative

SPEAKER Let me know how were doing on the time will you

How we doing

SPEAKER Stand by

SPEAKER I want ~~to~~ you to monitor us hearing and see if we're on time

SPEAKER ROGER

SPEAKER Control no ags right

speaker We need the _____ but no ags

SPEAKER _____flight now run for 61-45

SPEAKER try- try the gimbals slack. Negative.

SPEAKER _____AGS is that what he said.

SPEAKER He's only reading out the ones he's leaving open is that right?

SPEAKER That's affirmative.

SPEAKER Okay. Wanted that in black in the checklist which he is deviating he's going to -

SPEAKER Yep, okay. I'll assume that other ones he didn't mention are closed then if they are blacked in.

SPEAKER Yes, by the book.

SPEAKER You're going to have to close that one.

SPEAKER You want that one closed?

SPEAKER yeah, then pull an in current. _____want that closed, it doesn't take any current.

SPEAKER _____ _____

SPEAKER Which circuit breaker is he talking about?

SPEAKER He said if you can leave the _____off operate off down these.

SPEAKER That's true. We want the heater circuit breaker left in though.

SPEAKER Okay, you listening, Luke?

SPEAKER Yes.

SPEAKER Yeah, we want the heater circuit breaker in but we'll stick with Dominy's.

SPEAKER Right.

SPEAKER Dub gone?

SPEAKER Fight, go.

SPEAKER Go.

SPEAKER Okay, we've got a - our ~~made's~~ loads ready to go here, flight. We want to load a vector and start a Delta V.

SPEAKER Okay.

SPEAKER Okay that _____been verified yet? Is this the same vector that's being run on a hybrid? Close to it, flight. Essentially the same thing.

SPEAKER You're sure of that?

SPEAKER Rog.

SPEAKER All right. And when they run it and say it's okay, we can assume it is. Is that right?

SPEAKER That's affirm flight.

SPEAKER Now, is it the same vector we would have used for this DPS plus 2 _____plus 2 R or is it a different one?

SPEAKER Well, it's part of the present vector flight. The only problem that we were worried about was the integration problem ~~of the~~ onboard.

SPEAKER Yeah. Un huh, okay, in this scaling and all that business.

SPEAKER Yeah, but the vector doesn't really matter that much - what vector it is. This is essentially one we need to load this even to do a P47 we'd have to ~~lae~~ load this vector.

SPEAKER Negative. Say again. Tell me you're negative.

SPEAKER Negative.

SPEAKER In CAPCOM if we can get POO in DATA we will put a state vector and target load in for them.

SPEAKER Yes. Guidance, you should have it.

SPEAKER Okay, flight we'll have to wait till they get that uplink configured. ENCO's working on it. _____negative. Yaw negative.

SPEAKER Flight coming down.

SPAKER Before we burn here we should ~~depoly the~~ deploy the landing gear so we don't get any control problems here.

SPEAKER Does that come up somewhere in the procedured.

SPEAKER It comes up, flight.

SPEAKER Say again.

SPEAKER That's right. It comes up_____

SPEAKER I didn't hear his quesiton, Jack.

SPEAKER Ascent ~~deseent-- Ee-p-- ECapanel~~ ECA p in panel 11, we want it open or closed?

SPEAKER Open/

SPEAKER Open.

SPEAKER Okay, are we ~~happe~~ happy with that circuit breaker configuration. or do we want them to press on.
_____~~press-ON.~~

SPEAKER Circuit breaker panel control go or no/go.

SPEKER Controls okay.

SPEAKER _____

SPEAKER Go.

SPEAKER Guidance.

SPEAKER We're go.

SPEAKER _____

SPEAKER Go.

SPEAKER Okay, CAPCOM.

SPEAKER What about the landing gear.

SPEAKER They'll come to that in the checklist apparently.

SPEAKER Okay.

SPEAKER Flight, FAO, we concur to that.

SPEAKER We concur. FAO concurs. ENCO do you have the omni for the burn attitude?

SPEAKER _____we're in the middle of a load right now.

SPEAKER Oh, okay. What do you mean - you don't know how to maneuver?

SPEAKER That's right, let's hold it -

SPEAKER CAPCOM ~~epu-~~ could you hold ~~it~~ lthis maneuver until we finish the load, please?

SPEAKER Flight, control. I Go.

SPEAKER Got an MIT recommendation for the maneuver to attitude is to use a TPCA rather than the auto maneuver. _____over.

SPEAKER Okay, he's been doing that move _____

SPEAKER Okay.

SPEAKER Flight, we're through with _____maneuver.

SPEAKER Okay. And you want TTCA's, right? Control. For the maneuver. You want TTCA's for the maneuver, right?

SPEAKER ~~The-~~ Through the burn attitude that's affirm. ~~Thia--~~ That is affirm ~~flight~~ flight.

SPEAKER CAPCOM, Flight. We're through with the loading. He can go ahead with his maneuver. We recommend use his TTCA. WE recommend that and we're through with the load.

SPEAKER Okay, everybody in ~~te~~ the room, we're back on the checklist.

SPEAKER _____with us now on the checklist?

SPEAKER Do we want to do the self test? Guidance.

SPEAKER Flight we did the - check the E minus and the E _____was go.

SPEAKER Do you want to do the self test?

SPEAKER ~~H6~~ 86 activation. On the 2I activation. Do you want to do the self test?

SPEAKER Flight, FAO you can get _____to do it.

SPEAKER It's not required for it. Negative.

SPEA_ER Okay, let's go. Let's listen to LOOP and answer to questions.

SPEAKER Answer up on the checklist.

SPEAKER Negative. CAPCOM.

SPEAKER ~~#~~ 87.

SPEAKER Affirmative.

SPEAKER Un huh.

SPEAKER Okay, everybody we're on page 9 now, right.

SPEAKER ~~Ø~~ Yep. We scratched the VHF, how about this _____ clock _____there guidance.

SPEAKER _____taking care of that flight.

SPEAKER Okay. Already done.

SPEAKER Flight they can pick up at the landing gear ~~to~~- deploy at the bottom of 10.

SPEAKER Okay, well ~~#~~ let's walk through it one piece at a ~~#~~ time.

SPEAKER Okay. That's good Spence, but I don't want to skip anything, just let them go through it.

SPEAKER Do we need that landing gear out?

SPEAKER ~~Yeah,-the~~ Yes, they want it out.

SPEAKER And we don't want the steerable.

SPEAKER Control, you want that done, right?

SPEAKER That's affirmative (Two voices).

SPEAKER Okay, stand by for landing gear.

SPEAKER Okay, let's ~~wat-the~~-- watch the pyro and the landing gear, there, gentlemen.

SPEAKER Okay, pyro's fine. It looks like landing gear deploy from your point.

SPEAKER Want to scratch that?

SPEAKER Control concurs.

SPEAKER How about ags.

SPEAKER Lead ags activation self test _____

SPEAKER _____complete?

SPEAKER That's correct. Then at target. Right, guidance?

~~SPEAKER~~- Guidance, right?

SPEAKER YOu had a target load, also, right?

SPEAKER You've got it flight.

SPEAKER How about you guys keeping ahead, here?

SPEAKER How about ags aline, flight.

SPEAKER We don't ~~k~~ need that. No ags aline.

SPEAKER Recommend we don't do that flight, over. _____do just close the decca power breaker.

SPEAKER Okay, you don't want to do the test.

SPEAKER Negative.

SPEAKER You ready for DPS_ pressurization and checkout?

SPEAKER Flight, guidance.

SPEAKER Affirmative.

SPEAKER Yes. We need to configure the ADAP.

SPEAKER ~~Wkth~~- With what we read on the PAD.

SPEAKER Okay, does he - _____

SPEAKER _____step 2.

SPEAKER Wait a minute, step 2, okay, yeah. Okay, ~~pabe~~- page 14.

SPEAKER Okay.

Here's page 14. Okay. How about 3, 4, 5, and 6 there, control. Although they don't need it.

That's what we're deleting.

Steps 3, 4, 5 and 6.

Right.

Wait a minute. We need to do step 2. Right Guidance?

Just a minute.

Oh, okay. TGCA.

Roger.

Let's start later on flight.

Do TGCA -

Okay. But do we do it here. If we do it here, lets do it here.

Okay fine.

Yes CAPCOM.

You want steps 2 and 3 on page 14?

No. No. They were discussing the last thing on page 13.

_____ Oh, okay.

_____ TGCA both throttle them in.

_____ Okay.

_____ Right, Joe?

_____ That's what we've got in step 3 too.

_____ Flight control.

_____ Go ahead.

_____ Okay, stand by.

_____ It's affirmative Flight. Need to trim the gimbal. Not the throttle.

_____ Don't - Need to trim the gimbal -

_____ In fact, if you want to make a sample just - you can do the DAP set, give a throttle tests, steps 1, 2, and you've got it.

_____ Okay. Do you want to do all of step 1 now? Is that what you're saying?

_____ Roger. Set you up. You're on step 2. That's fine Flight.

_____ Okay CAPCOM. Correction. They want to do all of step 1 and step 2. Is that right now Control?

_____ That's affirmed, Flight.

_____ Guidance, we're going to do all of step 1 and step 2. Got it?

_____ Rog.

_____ Step 1.

_____ Okay. One other comment Flight. Down in step 5, he dearms the DPSs. Okay?

_____ Yes.

_____ He has to do that particular item.

_____ Okay. We're just getting there. We're going through them one at a time, 1 - 2.

_____ Okay.

Watch him do step 2 there, Guidance. When he gets to it.

We just got a PNGGNS LOW low control to OFF.

To OFF?

Yeah. That'll do the same thing.

It's in IMPULSE now. You shouldn't be firing any jets.

Is that one of his ACA.

Okay.

Why can't he do it in AUTO? Why is - -

Okay. When he goes to AUTO he goes to energy in low mode, to fire jets to go to the attitude. To Hold up the attitude he's in right now.

Okay. That's no problem.

What do you want us to do, Control?

What do you want us to do?

You want an OMNI?

Stand by 1.

_____ We're still on up on step 1 near as I can tell.

_____ Stand by _____

_____ Flight Control.

_____ Okay. Let's go to AUTO for the checklist.

_____ Clear the checklist, CAPCOM.

_____ Okay. You want him to pull his TCA breakers so that he doesn't get any red flags - jet firings that is.

_____ Well, what's the problem with jet firings? I don't see any problem with these _____ dead bands.

_____ And the note expects it.

_____ Yeah.

_____ And if he gets them, it's okay?

_____ Yeah. Just do per the checklist.

_____ Okay.

_____ Control.

_____ We hadn't stopped.

Go to AUTO and then stop. Then go look at it.

Go to AUTO and then what?

And then stop. That's the question he asked. He just wants AUTO and take a look at it.

Okay.

And then he gets the thruster firing and then what?

Okay to see - watch it settle down and then we proceed on to test.

All right. That's what you want to do.

Rog.

Got it Jack?

Will they stabilize with the dock configuration 9?

They should Flight.

Got the DAP set up for it.

Okay.

Okay. Let's watch it.

But no firings, right?

Okay.

Proceed on with the test.

We're ready to proceed.

And a little thruster activity.

Yaw guidance down there.

Flight. Go.

You getting that GO yet?

Negative. We haven't received it yet.

What's your estimate on it?

We need it for the burn.

We're getting it right now, Flight.

Okay. Watch he's loading.

Guidance, Roger.

GO.

Okay. ~~He's~~ He'll be loading his gimbal now. Let's watch him.

_____ Okay. Watch your gimbal trim there.

_____ Roger.

_____ Flight pattern.

_____ Okay. Closest approach will be 136.5.

_____ Thank you.

_____ Flight Control.

_____ Yeah.

_____ On step 2, that reload - load 48 and NOUN 46, the DAP load 32021 that was not correct and that we have to load that _____ right now. He didn't put that in.

_____ What do you want us to do?

_____ You should go by the checklist. 32021.

_____ Okay. Where's that?

_____ Step 2, second line.

_____ Okay.

_____ Page 14.

CAPCOM, you got that?

_____

_____

Clear the book.

You can do that after you get through with the test.

No problem.

Well okay. But it's there for some reason.

FA, how we doing on time?

Flight, we're shooting all right. The only other thing we got left - the DPS _____ and -

And then we go into the 6 minute - -

That's right.

All right.

Keep track of us here, Spence.

You about ready with the gimbal?

Okay.

_____ Ready.

_____ Ready for the gimbal.

_____ All right.

_____ Got DPS ARM and we're driving.

_____ Okay. And one other points brought out here. We've got 4 jet ullage low in the DAP and we've got 2 in the pad.

_____ Control.

_____ That's right, Flight.

_____ What do you want us to do?

_____ Stand by 1.

_____ Okay to bring us a pad the DAP load will be changed to be 31021.

_____ Well, you want to - why not leave it the way it ~~s~~ is.

_____ Well ~~w~~ why not leave it the way it ~~i~~ is.

_____ (both talking at once)

_____ Say again, Flight.

_____ You copy that. We're going to do a 4 jet. That's what we've got loaded. All right with you.

_____ Rog.

_____ Go with the way it is and fly in.

_____ CAPCOM, mention that to him so that he doesn't think of it later and get confused ¥ø so we're going with the 4 jet viz the 2 jet on the pad.

_____ Okay. We seeing his gimbal go where it's suppose to.

_____ Yeah. It's over against the stars and coming back now.

_____ On the way.

_____ OKay.

_____ We're going to _____

_____ Flight Control.

_____ Go ahead. Trim looks okay.

_____ Okay.

_____ Looks good.

_____ What numbers did we actually read out?

_____ How close were they?

_____ We were in about a 3/10ths. We're fairly close.

_____ Roger. We're ready.

_____ Do what?

_____ Wait a minute. Didn't you want the engine arm OFF?

_____ It is OFF.

_____ Okay.

_____ Everything else is okay, steps 3, 4, 5 and 6.

_____ From what I can see, it is.

_____ All right. You ready for - -

_____ You don't have any question about that then, do you, Control?

_____ No. It looks fine.

_____ Fine.

_____ You're ready.

_____ We coming up on OMNI?

_____ _____ Flight.

_____ Okay. Keep guiding it, okay.

_____ Looks good.

_____ Okay.

_____ Delete that Flight.

_____ Delete all of it?

_____ Affirmative.

_____ Yeah. If we do it at all.

_____ _____ CAPCOM.

_____ How does the DPSs look?

_____ Looks fine.

_____ Great.

_____ Okay everybody. We're holding at about the 6-minute point in the checklist.

_____ Okay. At the bottom of page 15 we've got a new DAP.

We got 31021. You want that in there?

_____ That's what put us in the 2 jet _____

_____ Right.

_____ That will put us in 2 jet system B for the ullage.

_____ Okay.

_____ But -

_____ Just leave it alone.

_____ Yeah.

_____ We'll leave it where it is.

_____ Rog.

_____ We told him 4 jets. Thats what he's got.

_____ Roger.

_____ And we - has he passed page 15?

_____ Yeah. He's right here.

_____ He's on 16.now, right?

_____ Yeah. He's into it.

_____ Guidance Flight. I'm waiting for that GO.

_____ We're watching his P-30 here. It looks good.

_____ Yeah. But have you got somebody talking in my tape?

_____ They're still talking to him. Got an estimate yet.

_____ Well, we've got 15 minutes to the burn.

_____ Control Flight. GO.

_____ How do I do this burn if I get a NO-GO on the DAP control?

_____ Okay. Stand by 1 and I'll give you a run down on the flight and put all my thoughts here.

_____ Flight Guidance.

_____ Yeah.

_____ I'd recommend going ahead and doing this burn if we don't hear from them _____. They feel it will work without _____.

_____ Everybody feels that it will work.

_____ Okay. What do we do during it if it looks funny, is my question.

_____ During the burn?

_____ Yeah.

_____ Control Flight, _____.

_____ You want to do a PNGGS AUTO at TTC-

_____ Yeah. TTCA, Roger.

_____ TTCA, CAPCOM.

_____ We recommend TTCA to the attitude.

_____ Was a TTCA.

_____ ENCO what's ~~a~~ our OMNI for this burn attitude?

_____ Forward.

_____ Does he have it down there now?

_____ He's ~~t~~here now.

_____ Okay.

That attitude doesn't look like what I have on the pad here.

Flight.

Yes.

You like ¢ø®®¢¢ that attitude?

I'm looking at it. Stand by.

Guidance, Flight. You copy that.

What's on the ball right now?

What angles are you looking at, CAPCOM? You looking at the ball angles?

I'm looking at all of them. I'm looking at what he's got on 50 18 on the DSKY and also what he's got on - -

Flight. The pitch and roll look great.

The yaw, the only reason it looks different is just that he's sitting there right now.

_____ Sitting where?

_____ At the attitude he's at presently.

_____ The pitch and roll are correct.

_____ Yeah. On the DSKY.

_____ Is that right?

_____ Right.

_____ And the FDI is different.

_____ Flight, we're looking at the FCD Us and they're correct.

_____ Un huh. How about the yaw?

_____ T Is that the one that's out yet?

_____ And is he moving in that attitude?

_____ Yaw, doesn't matter Flight. That's about the thrust vector. That's just where he happens to be.

_____ Okay. We're ready for (both talking at once)

_____ _____ and yaw.

_____ Yeah.

_____ Do you want him to go to a particular yaw?

_____ Guidance.

_____ Negative, Flight.

_____ We okay on the OMNI? That we're on.

_____ ENCO. We okay on this OMNI?

_____ Yes. The OMNIs ~~#/#/#~~/ø they're on will be good.

_____ Okay Guidance.and Control, Flight.

_____ Go ahead, Flight.

_____ I still have a question as to what you want me to do if somehow or other something turns up in the Guidance during this burn.

_____ Okay. I have a recommendation, Flight.

_____ And it is.

_____ Okay. Setting up the burn, we would turn the engine gimbal switch to OFF. We would go to PNGNS AT HOLD min impulse on the _____

Wait a minute. Engine gimbal this - wait a minute.

We're in the burn and this is what you - -

Oh, this is the under burn you're talking about.

Well, okay.

That's when to start it. What do you want me to do?

Okay. If he's in the burn, it'd go engine burn gimbal OFF and just use a TTCA to HOLD attitude and then as he can to turn the MOCA switch to AT HOLD.

Load control to AT HOLD. Rog.

In that order?

Yeah. And then you can gimbal off, mode control to AT HOLD and utilize the TTCA.

Okay. So you changed the order.

Well, this mode control to AT HOLD he can do that. He should do that as soon as he can but the most important thing is to get attitude control and he has to do that with the TTCA. So it will probably be simutaneous thing.

Okay.

Okay Flight. Now you verify his attitude.

Guidance you verify his attitude? is okay?

He's not at attitude yet, Flight.

Is he moving?

Rog. He is moving.

When he gets there he'll be in good shape.

Is there anyway we can check this now? Is there a star out his window or anything?

We're right in this - right now, we're running this to see if there is a star available at the attitude he's maneuvering to.

Fine. Hurry up.

There wasn't at the previous one that we had.

All right.

So he's going to a different yaw so we're checking it.

_____ Flight, _____.

_____ Go.

_____ If we don't get the attitude soon, we're going to be running behind here.

_____ Okay. How far away are we?

_____ I'm in the same boat as - -

_____ Guidance. What are the IMU attitudes that are on the DSKY that we're looking for?

_____ Guidance?

_____ The IMU?

_____ What attitude would you read on the DSKY when he's in attitude?

_____ 50 - 47

_____ CDUs

_____ is yaw. Pitch is 178.1 and roll is 4.77.

_____ How far away is he?

_____ He's just about there.

_____ He's right there now, Flight.

_____ We got any physical reference he can use?

_____ Okay. Have you seen a star yet?

_____ Okay.

_____ Did you verify the attitude?

_____ Guidance, do you like the attitude?

_____ Looks good ~~Guidance~~.Flight. The attitude looks good.

_____ The sun is out the forward window.

_____ That pretty much obscures the star.

_____ Guidance, Flight.

_____ Flight, Guidance.

_____ Have you got anything on confirming the attitude?

_____ Negative, Flight. The only star available is star 86, there.

_____ Flight _____ will not have a run on this thing.

_____ Okay. But is the judgment that is okay to use.

Rog. It is.

The judgment of the software people it's go. It's good.

It will be all right.

That's right.

Flight, Control.

Go.

Okay. Could we possibly look ahead here and get some of these done ½ so it doesn't get too crowded right Right at the start of the liner. A couple of items need to be taken care of.

Like what?

Well, we need to get throttle control to MANUAL. It's in AUTO right now. And the form and the _____ VERB 65 in.

Okay. Whats the matter with them going through the nominal checklist?

Okay.

_____ He's in attitude. We're up to 6-minute point. Very comfortable.

_____ Okay.

_____ I won't change anything here.

_____ Okay.

_____ CAPCOM, Flight.

_____ CAPCOM, Flight.

_____ Go.

_____ Jack, your opinion. Think it'd be worth revealing that if he sees any kind of rates or anything to go engine gimbal OFF, mode control ACT CONTROL, attitude HOLD, and TTCA? I guess we're through being with him. To finish the burn.

_____ I don't think it'd hurt to talk it over with him.

_____ Okay.

_____ It's affirmed.

____

_____ Affirmative.

_____ Flight, _____.

_____ Yeah.

_____ For your information, our water rates have dropped down a little in our favor.

_____ Thank you.

_____ Flight.

_____ CAPCOM.

_____ Yeah. I just mentioned it to him.

_____ Whose calling.

_____ CAPCOM's calling. I noticed on page 17, MANUAL THROTTLE.

_____ Control.

_____ Stand by 1, Flight.

_____ Top of page 18.

_____ He's right.

_____ Negative, Flight.

_____ No need for that, Jack.

_____ Flight, while he's going to do that, you might flag him on page 17.

_____ Yes sir.

_____ Throttle control AUTO should be throttle control MANUAL.

_____ Okay.

_____ And you can _____ turn on at the bottom.

_____ Okay. CAPCOM you got that. Throttle control in the middle of that stuff in 4 minutes.

_____ (both talking at once)

_____ Ullage? How much you want ullage?

_____ We'll just let it go ahead and start ullage automatically _____.

_____ We're ready to go ~~at~~ AUTOMATICALLY, Jim.

_____ Flight, Guidance.

_____ Go.

_____He He needs to go ahead and do an ENTER. His program is proceed on in 340.

_____ Okay. He needs to do an ENTER and PROCEED ON, CAPCOM.

_____ Just an ENTER.

_____ He did a flight. Stand by.

_____ Okay.

_____ And propellant quantity down to bottom. Don't worry about it. It's not _____.

_____ _____

_____ Yeah.

_____ CAPCOM, would you read him up that take over? If you have it there. Here it is, if you don't.

_____ Enter, Flight.

_____ You ready to ENTER.

_____ Right.

_____ You're in ENTER.

) _____ You said what is it.

_____ What did he say?

_____ _____ ENTER on 203.

_____ He said what is it.

_____ What is it, guys?

_____ It's for AUTO throttle, Flight.

_____ It's for AUTO throttle. It doesn't say much to me, Guidance. but we burn MANUAL, you know, Guidance.

_____ He's got a _____ throttle the thing, Flight.

_____ Yes.

_____ He needs to put his throttle to MAN also flight.

_____ Throttle to MIN.

_____ Yes, it's at 29 percent now roughly.

_____ Okay CAPCOM. He needs to go down -

_____ Stand by. Disregard that.

_____ Okay.

_____ I can't tell yet if he had OMNI DPS yet but you need to confirm that he does have it at MIN.

_____ Okay.

_____ Won't that control, Flight? Attitude hold and TTCA won't that fight itself?

_____ Negative. He's in MIN IMPULSE, Flight. If he goes to AT HOLD it turns the jets off.

_____ All right.

_____ Okay. How are you set up for 2 minutes?

_____ What's that tape counting down to Guidance to ullage?

_____ Negative, Flight. Engine ignition.

_____ Okay. Why is that clock counting to a different number up there?

_____ Well, it's time delayed Flight.

_____ Not the big one.

_____ That's the reason it's different.

_____ Plus he's ahead of us.

_____ Yehh. He is ahead of us.

_____ Flight Director, I've got a distribution panel 147 145.

_____ Is he loaded correctly?

_____ Say again?

_____ Guidance _____. Is he load correctly?

_____ That's the question.

_____ His tig is right.

_____ TIG is right. Right on board. Thank you.

_____ One o'clock is wrong, Flight.

_____ Thank you.

_____ Okay. How do you like his configuration at 1 _____?

_____ Control. Everything okay with you?

_____ He didn't see the VERB 65, but that's okay if he doesn't get it.

_____ Are you satisfy with the throttle or is he not ~~ø~~n ARM.

_____ He's not ARMED yet Flight.

_____ All right.

_____ Guidance okay?

_____ We're good, Flight.

_____ Control, okay.

_____ We're okay, Flight.

_____ _____. We're GO, Flight.

_____ ENCO, okay?

_____ We're good, Flight.

_____ All good here at 1 minute.

_____ Still don't learn 65, Flight.

_____ Do you want to tell them?

_____ Yeah. Tell them we need ENGINE ARM. He's got it.

_____ We're at low throttle point.

_____ Need a VERB 65 ENTER.

_____ Is that what you're telling me Control?

_____ Disregard.

_____ Thank you.

_____ We have ullage.

_____ We have ignition. _____ at a point.

40 percent.

_____ The rates looks good.

_____ The rates are holding good, huh?

_____ Looking okay, Flight.

_____ Okay.

_____ Still looking good.

_____ Shut down.

_____ _____

_____ Okay. ~~Whats left~~ How about whats left over?

_____ Any requirement to trim?

_____ You've got enought to trim, Flight.

_____ Trim to what?

_____ 2/10ths.

_____ Well, it's kind of hard to do that. That's good isn't it?

_____ That's good enough.

_____ Good CAPCOM.

_____ Yes (laughter)

_____ Flight tell me you should rest your ARM off

////// And he can go back to MIN IMPULSE when he desires, Flight.

_____ Okay. Well now he's got to go through a number of things right?

_____ Rog.

_____ Okay Control. The next question is what control mode, if any, do you ~~a~~ want to be in here work with the backroom. Do we want to try and set up some kind of PTC and AGS or are we going to just POWER ~~ARM~~ down and let this thing drift?

_____ Okay. Let me pull my thoughts together for a minute Glynn.

Yeah.

Okay, but you have somebody work that. I want you to watch ~~for~~ the configuration here.

Yeah. Right.

Flight, Enco.

Go ahead.

Got a minute to talk?

In just a minute.

Okay.

Flight, Control.

How are we doing. Are we getting configuration master ARM?

No. We still got the MASTER ARM OFF~~?~~.

Yeah. You better have them take the MASTER ARM OFF.

Control. Anything for configuration?

The only thing I recommend if he wants to the VERB 76 but I'm happy with the way it is right now.

_____ We're going to turn the PGNS down here pronto.

_____ Yeah. We've got to get the AGS turned up though, and I've got the procedure.

SPEAKER _____have _____

SPEAKER We have ignition,low _____.

SPAKER $0 percent.

SPEAKER _____looks good. Rates are holding good, huh?

SPEAKER Looking okay _____.

SPEAKER Okay.

SPEAKER Still looking good.

SPEAKER Shut down.

SPEAKER Okay.

SPEAKER Okay. What about what's left over?

SPEAKER Any requirement to trim?

SPEAKER Trim to what?

SPEAKER Well, its kind of hard to do that. That's good isn't it?

SPEAKER That's good enough.

SPEAKER Good, CAPCOMM.

SPEAKER Yes.

SPEAKER Ah, -

SPEAKER _____ you should MASTER ARM off, and we can go back to MEDIUM VOLT when desired, _____.

SPEAKER Okay, well, now he's got ~~xxgxxxx~~ to go through a number of things, right?

SPEAKER Right.

~~S~~SPEAKER Okay, control, the next question is what control mode, if any, do you want to be in here? Work with the _____? Do we want to try to set up some kind PTC and AG? Or are we just going to power down and let this thing drift?

SPEAKER Okay, let me pull my thoughts together for a minute, Glenn.

SPEAKER Okay, but you have somebody work that. I want you to watch the configuration here.

SPEAKER Yes.

SPEAKER _____, Jim.

SPEAKER Good.

SPEAKER You got a minute to talk?

SPEAKER Yes, Just a minute.

SPEAKER Okay.

SPEAKER Flight, from control. How we doing? We getting configured MASTER ARM?

SPEAKER No. We still got the MASTER ARM on.

SPEAKER Yes. You better have them take the MASTER ARM off.

Control, anything for configuration?

SPEAKER The only thing I Might recommend would be _____VERB 76 but I'm happy with it the way it is right now.

SPEAKER We're going to turn the PGNCS down here pronto.

SPEAKER Yes, when I get the AG's turned out though, I got the procedure to gove - -

SPEAKER Well, now do we.

SPEAKER Have to get it turned up?

SPEAKER Ah, stand by.

SPEAKER How about just drifting?

SPEAKER If that's - -

SPEAKER Well, that's what I'm asking you.TO check.

SPEAKER Yes, I'll check. But let's not turn the PGNCS off right quick like. Let me check _____.

SPEAKER That's what we're going through right now.

SPEAKER Flight income.

SPEAKER Right.

SPEAKER If you're going to do something with powering down, you'd better do it quick ~~or~~ cause I'm going to have to make you do a handover here, and it's probably going to cost count for at least 5 minutes.

SPEAKER How soon?

SPEAKER You're going to have to hand over.

SPEAKER Well, my handover going to have to go on here in about 12 or 13 minutes.

SPEAKER Okay

SPEAKER And we want to turn off the receiver, transceiver for 5 minutes.

SPEAKER Good.

SPEAKER Ah, Fido flight.

SPEAKER Yes.

SPEAKER Do you have any requirements for the PGNCS anymore?

SPEAKER NE - -

SPEAKER I'm not turning it down now.

SPEAKER Look, ah - -

SPEAKER Cou - -

SPEAKER Go ahead.

SPEAKER Go head.

SPEAKER The current situation is - is that we're checking about the PTC. We have - do we have an AGs for procedure for setting up a PTC now, control, that people think might work?

SPEAKER Control, flight.

SPEKAER Do we now have a procedure that people might think will work in AGS?

SPEAKER Negative. Do not.

SPEAKER We don't have a procedure?

SPEAKER Not right now? In AGS for PTC.

SPEAKER Well, it all gradually gets academic, then, huh?

SPEAKER That's right.

SPEAKER Stand by 1, please.

SPEAKER Jim's checking to see what he wants to tell us about - -

SPEAKER We're getting _____ no PTC required.

SPEAKER Okay, well, we'll wait and see in a minute. If that's so it's no nadd in powering the AGS up.

SPEAKER That's right.

SPEAKER We'll wait for _____.

SPEAKER Okay, and if that's the case, then we'll go ahead down. The only reason I'm delaying in powering the PGNCS down is

to be sure we don't need Ags. Sounds like we don't know how to yse it anyway, but a good 2 minutes and we ought to know for sure.

SPEAKER Flight control.

SPEAKER Go ahead.

SPEAKER Understand we're to do another burn at 79 hours?

SPEAKER Say again.

SPEAKER Are we doing another burn at 79 hours.

SPEAKER Plan on that. Yes. I don't know whether we are or - -

SPEAKER How we going to get our alignment?

SPEAKER Plan on that.

SPEAKER Can you turn off the - -

SPEAKER Primary PGNC MODE CONTROL off.

SPEAKER Whatever he desires.

SPEAKER Stand by on that flight, stand by on that.

SPEAKER He ask if we could turn off the thrusters?

SPEAKER Stand by on that one moment, flight.

SPEAKER Flight to control.

SPEAKER Go.

SPEAKER The reason I ask, if we turn everything down now and we're going to another burn at 79 hours, how are we going to get our alignment.

SPEAKER Yes. I know. I know.

SPEAKER When is that?

SPEAKER _____ when the shadow of the moon, we might could get a P51 and 52.

SPEAKER Okay, flight, stand by and we'll look at that.

SPEAKER Tell me, flight, how much does it cost we to keep the AGs up? As a course reference?

SPEAKER That's going to cost water, not amps.

SPEAKER Say again.

SPEAKER Flight to control.

SPEAKER Go ahead.

SPEAKER Some items we can actually pull right now and save some power that they don't need is the _____ Breaker, and the Decca gimbal and the decca breaker.

SPEAKER No w wiat a minute. We don't want to be out of attitude control, do we.

SPEAKER I won't put you out of attitude control.

SPEAKER Okay.

SPEAKER If you want to save some power now, we may have to put the back in later when we go to AGs but

SPEAKER Okay, which ones were they?

SPEAKER The ATCA on CB16 and the Decca gimbal and Decca power.

SPEAKER Yes, we can sure turn those off.

SPEAKER Right.

SPEAKER I suggest we do that. Let's start with the Decca ones, all right?

SPEAKER Right.

SPEAKER If you all want to you can do.

SPEAKER Okay, we confirm they're open, flight.

SPEAKER Flight, _____

SPEAKER Ah, guidance, flight.

SPEAKER Go.

SPEAKER Can you give us star - ball angles I should say, for for a COAS star check in a shadow?

SPEAKER Yes.

SPEAKER Pronto?

SPEAKER In a moon shot?

SPEAKER No - no. In the shadow of the vehicles, looking away from the sun.

SPEAKER Guidance, can you get one of those in a hurry? That would give us a check on the reference before we do something with it.

SPEAKER Okay.

SPEAKER CAP COMM while we're going through this subject, two items for power conservation would be the Decca Gimbal power circuit breaker on panel 16- 11

SPEAKER Ll

SPEAKER 11 for the Decca gimbal and decca power. ATCA is on panel 16.

SPEAKER What control now do I have if I turn of the ATCA PGNC circuit breaker?

SPEAKER Not ATCA PGNCS, just ATCA.

SPEAKER Oh, okay.

SPEAKER The ATCA on panel 16.

SPEAKER Roger.

SPEAKER Okay.

SPEAKER There are a couple of power items while we're figuring out what to do -

SPEAKER How about the idea you just gave us about using the command module optics manual to find stars.

SPEAKER Well, we can do that. Now what's our objective now - to platform again?

SPEAKER I mean we can do a lot of things, I want to know why we want to do something.

SPEAKER (Garbled)_____

SPEAKER Got it.

SPEAKER Okay, look, I'm running out of time.

SPEAKER Yes, I know.

SPEAKER Now, we've got to do a handover here. We don't have any choice. To try to make it as quick as possible, I want you to turn down the transceiver for 5 minutes; let us push the IU out of the way, and then bring up the carrier after this 5 minutes when it comes down we will distinguish the LM. This is the quickest way we know how to try to do

it, and we hope it works better than last time.

SPEAKER Okay, well you got a handover now, do you _____

SPEAKER We don't have any choice. It's going to have to be one way or another; it's either going to be the hard way or the easy way. I can't guarentee either way.

SPEAKER Okay, I wish I knew what we wanted to do here before we lost count.

SPEAKER Flight Control.

SPEAKER Go ahead.

SPEAKER I've got a recommendation.

SPEAKER Go ahead.

SPEAKER Capcomm, we gave them a go on that, didn't we? He probably didn't hear it. Hook up the side hatch here and dump.

SPEAKER Has he got it - Has he got it hooked up now?

SPEAKER We don't know. He was -

SPEAKER If he had -

SPEAKER Oh, you don't want to?

SPEAKER What do you want them to use?

SPEAKER Use a normal procedure. _____ let me explain that.

SPEAKER Flight ENCO I've got a degree left, that's it.

SPEAKER CAPCOMM, We're going to have a loss of COMM while we switch stations. Let them know that, will you.

SPEAKER Flight, that's not what I want to do. I want them to turn the transceiver off for 5 minutes.

SPEAKER Okay.

SPEKAER CAPCOMM, have them turn off the S-band transmitter receiver.

SPEAKER 5 minutes -

SPEAKER 5 minutes -

SPEAKER 5 minutes-

SPEAKER Flight Control.

SPEKAER Can you wait Control?

SPEAKER Rog.

SPEAKER He has to turn off the S-band transmitter for 5 minutes while we do a site handover with this COMM situation.

SPEAKER Tranceiver.

SPEAKER Flight _____

SPEAKER Go ahead.

SPEAKER Okay, confirm burn shows - FIDO stand by for a minute.

SPEAKER Roger.

SPEAKER Unless youm got a problem.

SPEAKER No problem.

SPEAKER That's affirmative.

SPEAKER Control Flight -

SPEAKER Go ahead Flight.

SPEAKER Affirmative.

SPEAKER That's good enough; that's real good.

SPEAKER - do you want to get a transmitter receiver?

SPEAKER You ready for that?

SPEAKER They're ready.

SPEAKER Go.

SPEAKER Turn it off now?

SPEAKER Rog.

SPEAKER Go ahead for 5 minutes.

SPEAKER It doesn't have to touch the power amp, just the transmitter receiver and you better hurry.

SPEAKER They waht to get some kind of roll attitude going if possible. Control Flight -

SPEKAER Go ahead Flight.

SPEAKER Can you figure out that we'd point the thing north; can you give us a MODE and a AGS that we can set up a low roll rate?

SPEAKER Yes, we can come up with one Flight.

(TALKING TOGETHER)

SPEAKER Can I have, can I ask for a little quiet in the room, please. I'ts getting awfully noisy in here.

SPEKAER We can work on that, but I got something in my mind here

that I think we ought to do first.

SPEAKER Okay, and that is -

SPEAKER And that is to bring the PGNS - bring the AGS up, take the PGN's alinement to it, turn that PGN's off/ -

SPEAKER Yes.

SPEAKER - where he can fire.

SPEAKER Yes.

SPEAKER We can do that now.

SPEAKER Okay, as soon as we can get the COMM.

SPEAKER ~~I got the receiver for the~~ And I got the procedure for doing it.

SPEAKER Bring it over please.

SPEAKER FAO Flight.

SPEAKER Go ahead Flight.

SPEAKER When are we going to have the timing that we're in the moon shadow?

SPEAKER I'm trying to find out from FIDO now when he's going to

make the reference swithh, Flight

SPEAKER Okay. Pronto okay, as soon as you can Bob.

SPEAKER Roger.

SPEAKER Flight _____

SPEAKER Go ahead.

SPEAKER Would you like some post-burn data?

SPEAKER Yes.

SPEAKER Okay, ~~post-burn~~ /¢1ø// /// closest approach 136 decimal

75.

SPEAKER That's based on the Confirm maneuver =

SPEAKER That's affirm.

SPEAKER - turn the PGN's.

SPEAKER That's affirm.

SPEAKER We've got a gamma/at entry ¢1¢ interface, negative 6 decimal

53.

SPEAKER Okay, I'm with - it's all come out nominal then.

SPEKAER Rog. And what's even better is that the Doppler is within

7 cycles.

SPEAKER So you think the Doppler comfirms it?

SPEAKER The Doppler says we did the right thing thus far.

SPEAKER All right.

SPEAKER FIDO and GAFAO, when are you going to have the time for me when we're behind the moon?

SPEAKER Hold on a second now, Jack.

SPEAKER Yes, you're on my loop Ed.

SPEAKER What's the conclusion, we can keep the IMU up?

SPEAKER And we got that water?

SPEAKER Tell me _____ Flight.

SPEAKER Go Flight.

SPEAKER Hey, are you guys coming together with what's being discussed here for recommendation, and I'm being told that we could conceiveable leave the IMU up in the LM - turn the LGS I guess, off right now; leave the IMU up; and power down post PC plus two DPS burn - Are you involved in at all?

SPEAKER Yes, I have to look at the total load there, of course, we have been kind of involved with EPS, considering -

SPEAKER Bill Peters has been in, Bill would you quick take them down. I'd like quickly to know what you want done.

SPEAKER Flight ENCO.

SPEAKER Good.

SPEAKER Have at it.

SPEAKER Okay.

SPEAKER _____

SPEAKER Tell me Flight, - Gentlemen, it's getting noisy in the room -

SPEAKER Go ahead Flight.

SPEAKER Let's keep down the conversations.

SPEAKER Flight Control.

SPEAKER Okay, Go ahead Comm Flight.

SPEAKER One - Control - One thing to consider Glen is if we do this, we're going to have to have a - implement a method

to keep them out of GIMBAL lock.

(TALKING AT ONCE)

SPEAKER We're just going to have to watch it.

SPEAKER He's got nothing to watch on board, we're powering everythin down.

SPEAKER No, we're going to leave the IMU up.

SPEAKER Okay, we're going to leave the rudders up them.

SPEAKER Okay, well that's for you to tell me to tell me.

SPEAKER We need an DAP load to conserve RCS.

SPEAKER A DAP load to conserve RCS, Control

SPEAKER Okay.

SPEAKER He wants it right now?

SPEAKER Yes.

SPEAKER Right now.

SPEAKER Flight Control.

SPEAKER Go ahead.

SPEAKER Recommedd he go VERB 76 at mid impluse and then keep his

eye on the milli-GIMBAL angle.

SPEAKER Okay, is that all you got to tell them for the -

SPEAKER Yes, the DAP load is okay, but he needs to go mid-impulse, -

SPEAKER VERB/76/ Okay.

SPEAKER VERB 76 and keep an eye on the milli-GIMBAL angle.

SPEAKER _____ Flight.

SPEAKER Go, Flight.

SPEAKER I guess I need to kind of know here, as much as you do,

SPEAKER Rog.

SPEAKER If we're okay to leave the IMU up and we can swing it,

then I'd just as soon do that.

SPEAKER Yes, I think that's the way it's looking right now.

SPEAKER How long will take you to include that?

SPEAKER Just a couple of more minutes.

SPEAKER Do we have a PAD for 79 hours?

SPEAKER Not yet, I'm sure.

SPEAKER Okay gentlemen/ _____

before the room right now, is to turn down the LGC, and to pick up all the rest of the smaller power items we can, leave the IMU up; _____ is within a few minutes of commenting on that subject.

SPEAKER Yes. We can do that Flight, with the IMU up in the AC. It looks like it would probably be -

SPEAKER The AC, you mean one ball, okay; is that what you mean?

SPEAKER Okay. Yes.

SPEAKER It looks like also it would probably be cheaper powerwise to to turn the sterible on, if we can get COMM's attention here ENCO.

SPEAKER _____

SPEAKER Yes. Turn the sterible up, since we got the AC anyway, and power down the power amp.

SPEAKER Is that cheaper?

SPEAKER It's cheaper power-wise.

SPEAKER ENCO, is that okay with you?

SPEAKER[We'll give it a try.

SPEAKER That' gives us kind of though, spotty coverage, doesn't it?

SPEAKER We're going to have to get in a different attitude.

SPEAKER We're going to have to roll.

SPEAKER That's right. We're going to have to get out of the attitude we're in.

SPEAKER Can ~~we~~ you do it on the high gainer - you can't switch omni's anyway. But we've got a guy awake.

SPEAKER He;ll have to do it for us.

SPEAKER We've got a guy awake anyway. We'll, will we get high-gain coverage and then we'll drop off, is that what will happen?

SPEAKER Yes, it will go to the end of the ~~bb~~ackage _____ GIMBAL ~~kkkm~~ limits, and he'll have to switch to an omni.

SPEAKER Recommend something to me, will you? How many amps do we save?

SPEAKER Flight, we just gave about an amp and a half, so it's not an =

SPEAKER And, it's not a cooling item - it's not a water item, is it? All right, let's let that go for tonight anyway -

SPEAKER Okay.

SPEAKER - and then we'll figure something clever out for tomorrow night.

SPEAKER Okay, fine.

SPEKAER Okay, _____ have you put concluded on this LGC?

SPEAKER We're going to leave the IMU up, right?

SPEAKER Yes, but the computer you want to go down? If we want that, let's get on with it. Control, Flight.

SPEAKER Go ahead.

SPEAKER Flight, you ready? You and _____ are you together there?

SPEAKER Yes, I'm trying to get my _____ with him right now flight. Stand by.

SPEAKER Flight, _____

SPEAKER Go ahead.

SPEAKER You asked while ago about some stars. I got some stars - I picked out some stars to look - if you - I don't know if he wants to do any maneuvering; to maneuver, it's 180 degrees from the sun, to center into COAS.

SPEAKER Okay, we'll stand by with them _____

SPEAKER Flight, Control.

SPEAKER Yes.

SPEAKER Do we just tell them to power the computer down?

SPEAKER No, we're just advising on what the plan is going to be.

SPEAKER Oh, okay.

SPEAKER But we're waiting -

SPEAKER Yes, okay.

SPEAKER _____ Control, Have you got there yet.

SPEAKER Roger, Flight.

SPEAKER Roger, Flight.

SPEAKER You can go to power LGC

(TALKING AT ONCE)"

SPEAKER What do you want to do? Pull the circuit breakers?

SPEAKER Stand by.

SPEAKER Did you hand me something on it. I think Bob Carlton did, didn't you Bob?

SPEAKER Did you say power down, or power up?

SPEAKER Down.

SPEAKER _____, I'm talking - we're going to _____ _____ are you ready to proceed and power the computer down?

SPEAKER Negative, I do not want to power ~~it~~ the computer down.

SPEAKER Why not?

SPEKAER I'm being told, that we can leave up in the sleep period and it will keep their attitude form and will keep them out of GIMBAL lock.

SPEAKER The computer also?

SPEAKER Yes, that's what I'm being told. The LGC.

SPEAKER Okay, so you're telling them to leave the computer up also hyh -

SPEAKER Affirmative.

SPEAKER and that's okay on the profile?

SPEAKER That's affirmative; it's about 22 amps total.

SPEAKER And what kind of control mode do you see them in being here tonight?

SPEAKER Okay, just just in 5 degree Dead-band, attitude hold.

SPEAKER Wait a minute, we don't want to be in attitude hold, we want to roll. Oh, you want let roll go?

SPEAKER You can't let roll go. It's going to be an ATT hold.

SPEAKER Okay, but how can we fly an ATT hold the whole time; we're going to burn something up.

SPEAKER I've got the question in, and I haven't got an answer on it yet, Flight.

SPEAKER The tentative answer I got was that we did not require any PTC.

SPEAKER Yes, the only problem, Glenn, if in the other mode, if we just leave the platform up we may drift through GIMBAL lock

and then we've defeated our purpose of leaving it up.

SPEAKER We have a guy sitting there watching it. We're going to keep a guy up.

SPEAKER Okay, and we'll have to leave our inverters an also then.

SPEAKER Yes.

SPEAKER Okay.

SPEAKER That's - that was what I thought you were talking about-

SPEAKER _____ I was out of step with you, right, sorry.

SPEAKER and we'll set up a roll manually and we'll him watch and do the best we can like ~~if~~ we flew Apollo 8.

SPEAKER Okay, if you do it that way, you'll have to use hard over command on the AC 8 or stop any pertovations then?

SPEAKER Attitude direct control breaker will have to be in. Yes, use _____ on the SA 8.

SPEAKER Flight, Control

SPEAKER Flight, Control

SPEAKER Go ahead, Control .

SPEAKER All right, Glen, recommend that we go ahead and power the LGC down, leaving the inverter on so that we can get an attitude reference off the platform, and leaving - let the guy use the ACA to keep us out of GIMBAL lokk.

SPEAKER And set up whatever he can in the way of - it will be a -

SPEAKER PPC will be a palet yaw, Jim -

SPEAKER Okay.

SPEAKER - but he's got to watch his roll. He'g got to watch the middle GIMBAL.

SPEAKER Rog. The middle GIMBAL.

SPEAKER Okay. Now, is that the conclusion, and is that presumably good on the power profile, I want to see that profile by the way. TELL MU do you copy what we're doing?

SPEAKER Yes.

SPEAKER We're going to put the LGC down, and leave the 8 ball up and let them fly it; set up ~~what~~ whatever he can with body yaw.

SPEAKER Right.

SPEAKER Is that - is that the conclusion? And you got a power profile that says I'm okay to do that?

SPEAKER Right.

SPEAKER And you're going to show that to me?

SPEAKER Right.

SPEAKER Now, we're going to proceed then with the LGC power down, what do we do, putt the circuit breaker? Did you hand the paper? I think we gave it to you, didn't we Jack?

SPEAKER Is that the paper Carlton brought up?

SPEAKER Yes. Let me see -

SPEAKER That was - Hey, that's not what you want now.

SPEAKER No it isn't, you're right. You're right.

SPEKAER Where do I want the pole to power down the LGC?

SPEAKER Okay, you need a program 6 and and then pull the up PGNs LUC DSKY breakers on panel 11.

SPEAKER You mean put it in program 6 and pull the -

SPEAKER Yes.

SEEAKER - LGC -

SPEAKER Program 6, you hit a pro -

SPEKAER Okay.

SPEAKER - and then pull a _____ PGNs LUC DSKY breaker.

SPEAKER Okay.

SPEAKER You have a procedure written down in the surface checklist, G&N dictionary, and if we can refer to it, why, I think that would be the way to do it.

SPEAKER You got it there Spence?

SPEKAER Okay, does everybody copy what we're doing, TELL MU, Flight

SPEAKER Go, Flight,

SPEAKER Would you check the span one more time and be sure you're satisfied with what ~~you're~~ we're doing; we'll do the best we can to set up a body yaw, and let the awake guy watch it.

SPEAKER Okay.

SPEAKER Would you check ~~it?~~ them, and be sure to understand what we're doing.

SPEAKER Roger.

SPEAKER Guidance, and FAO, Flight.

SPEAKER Go, Flight.

SPEAKER Would you let me - give me the ball angles for the pilots to go nose north? CSM nose north?

SEEAKER CSM, nose north. Will do.

SPEKAER That is, PTC.

SPEAKER Okay, let's see.

SPEAKER Okay.

SPEAKER Are you ready for me to give the LGC _____

SPEAKER Let me get a go here. Control, you ready? TELL MU I mean, Are you ready? Did you get TELL MU, Flight? TELL MU, Flight.

SPEAKER Go, Flight.

SPEAKER Does Span know what you're doing in/the and agree.

SPEAKER I can't get in touch with him right now.

SPEAKER Flight, ENCO.

SPEAKER Go ahead.

SPEAKER We're ready to give a try at the power amp and the low

SPEAKER - _____ of the down voice backup if you want to try it.

SPEAKER Wait a minute; let me get my attitude and everything squared away.

SPEAKER Okay.

SPEAKER We're haveing a hard time getting people to agree with the procedure. TELL MU, Control, would you get to see if people agree with what we are doing?

SPEAKER Say again, Flight.

SPEKAER I'm trying to get the Span people to agree with the course of action we have here.

SPEKAER I can't get hold of them, Flight.

SPEKAER LGC off; and try to set up a body yaw; and let a man up to watch it.

SPEAKER Rog.

SPEAKER Can we hustle?

SPEAKER Rog.

And guidance,

SPEAKER [illegible] I'm standing by for some ball angles from you.

SPEAKER Flight, Control

SPEAKER Go ahead.

SPEAKER Okay, I made the imput to Span; they gave me one back that MIT has got a procedure for doing PTC in the PGNs, and it's going to be here in about 5 minutes, but this is requiring to keep the LGC up with the DAP running.

SPEAKER Yes, so, do we want to do that?

SPEAKER Well, it would make it easier on the crew, but I'm not sure whether we can stand the amp hours and water hours.

SPEAKER WEll, I guess I don't quite see the advantage in worrying about a new procedure and doing it tonight. We got - we got several -

SPEAKER [illegible] Yes, Okay.

SPEAKER - nights to go here, and we're going to have to do this procedure manually -

SPEKAER Rog.

SPEAKER - I don't see crashing in with a new procedure here myself.

SPEKAER Okay, I concur, but I just wanted to make you aware that they did have one that would be here shortly.

SPEAKER Right. Well. My vote is still like we discussed earlier. For tonight.

SPEAKER Yes.

SPEAKER Well I'm not getting anybody to come out and agree with me, so I guess we're about to press on here, with what we're going to do.

SPEAKER And I'm getting tired of waiting. I don't see the point of a new procedure.

SPEAKER Flight _____

how about AFT omni?

SPEAKER)Aft omni, please, CAPCOM.

SPEAKER Aft -

SPEAKER Look, Guidance and FAO, you going to give me that

answer any time soon?

SPEAKER - for We'll get it for you, Flight.

SPEAKER I want to know whether to put the LGC down, because if this orientation _____ is bad for PTC then we got to do something.

SPEAKER How long - GA0 out - give me an astimate, how logg you to be. How long you going to be checking that PTC - that _____go ahead.

SPEAKER Okay, that _____input is with that A is that we wait and the perfer is that we wait the 5 or 10 minutes that it takes for that procedure to get here and take a look at it and see if we don't want to impliment it for PTC.

SPEAKER Got it. Okay, but we keep stalling around, I don't see what it's going to gain us, we got to spend 3 or 4 nights doing this think manually. I don't dee what getting behind for one night - when it's putting us behind in power and water. I don't see any point. Somebody tell me what the

point of that is, maybe I'll buy it._____experimenting with a new PTC procedure.

SPEAKER Okay.

SPEAKER Flight control.

SPEAKER Go ahead.

SPEAKER Let's go with the prOcedure that we talked about earlier.

SPEAKER All right, but now I got to wait and see if the attitude I'm in is going to be good for this, because if it's not I need the computer to realine the LGC course and aline to something else.

SPEAKER Okay. Copy.

SPEAKER _____and take a look at it for me.

SPEAKER Okay, ~~Wrigh~~ write down - Or done Jack have excately what you want? PL6 pull the ~~LG~~ LD6 _____Baker bucher and we have it referred to in the checklist right?

SPEAKER Yes, in the_____dictioneay, okay?

SPEAKER Okay, I got VERB 3706 ENTER, FLASHING 50 25 and get a tripple ball 62 pro until the standby light is on.

SPEAKER Rog.

SPEAKER Pull the LDG disk circuit breaker.

SPEAKER Rog.

SPEAKER Want to do it? You want to do it?

SPEAKER I got to find out if the alingment is okay first, Jack, Or we'll end up turning it down and having to bring it back up.

SPEAKER The Charles flight? _____ Good.

SPEAKER Hal, one question, while we have the LGC up. Is it possible to use a mid impulse mode to set up - a - to set up this_____ and then turn the LGC off, would that buy us anything? Why don't you think about how you want the _____ do do this thing?

SPEAKER Before we turn the LGC off?

SPEAKER Yea. That make any sence to you?

SPEAKER Yea, but we got another way we can do it. _____

SPEAKER What is that?

SPEAKER Okay, we can turn the LGC off and then we can go to our energy controls and then we can go to direct on those.

SPEAKER Okay, do you think we can get a small enough pulse to not get to big a roll rate?

SPEAKER Yea, with out any configureation, you shouldn't have any problem.

SPEAKER Oh, in the dock configuration, okay. Standby for the FAO to check the present alinement for a PTC attitude.

SPEAKER We're working _____

SPEAKER _____

SPEAKER Jack, the pad we gave them before, it's no good now, and with this midcourse, - this return midcourse - this _____ PT2 PLSS pad is no good no more. A - I don't know, but - a dose he understand that the old one's no good?

SPEAKER _____

SPEAKER Caput, yea.

SPEAKER _____

SPEAKER Retrow flight go ahead a - when do we have a new paliminary

SPEAKER PAD FOR THE PC plus 2?

SPEAKER I could generate one a _____if you would like.

SPEAKER Okay, how long half an hour, 15 minutes?

SPEAKER About half an hour -

SPEAKER - to the MPL?

SPEAKER Okay.

SPEAKER

SPEAKER Flight _____

SPEAKER Okay, go.

SPEAKER To make this a little easier, why don't we ask him to disable the _____on panel 14 and to manage the omni's for us. Now when he starts to loose an OMNI you'll here it in his ear.

SPEAKER Right retrow.

SPEAKER Good.

SPEAKER Okay a couple of questions -

SPEAKER - wait a minute mitrow, I'll get you later.

SPEAKER Dose that make it easier on him or us?

SPEAKER Makes it better for everybody, we'll stay on good COMM.

SPEAKER Okay, that's a suggestion - why don't you suggest that to them with this - a - I don't know //I wether his signal strenght /s meter is AGC meter is up or not, but -

SPEAKER - You don't need it, you'll hear it in his ear.

SPEAKER I know that, I don't know if his meter is up or not, but if he disables his quelch that's a sure que that he ought to _____.

SPEAKER

SPEAKER CAPCOM flight. Control guidance flight.

SPEAKER GO ahead.

SPEAKER I'm up.

SPEAKER Go flight.

SPEAKER The current alinement pointing either north or south is very comfortable relative to the yaw. It's only 5 degrees off now so it's a long way from the gimbal lock. In which case we look goodxxkxxx with the present alinement. In which case I'm prepared to power down the KGN LGC and I want a final go for doing it from you guys. Are you ready? Gxxxxx? Guidance?

SPEAKER Ready.

SPEAKER _____ are you ready?

SPEAKER Go flight.

SPEAKER Tommy are you ready?

SPEAKER Go.

SPEAKER If You have maneuvered to attitude MIN, power down.

SPEAKER Why did you say maneuver to attitude?

SPEAKER Are'nt we in to the attitude, now, flight?

SPEAKER I'm sure we're not at the ~~REX~~ PTC attitude.

SPEAKER Alright then, what gear are you referring to?

SPEAKER And, we tell them not to use the LGC, anyway. We tell them to use the TGCA.

SPEAKER No, uh huh, you've got to have the, I believe, the LGC powered up, if you're going to use the TGCA in PGNS, right now, unless you want to go to AGS and do all that good stuff.

SPEAKER Okay. CAPCOM I don't have any druthers, here. There's a - LM axis south and LM ~~a~~xis north here. Whatever is convenient for him to go to from where he is now. Could FAL - could you tell that? FAL can you tell? Which is more convenient for him?

SPEAKER Let me check that flight.

SPEAKER Point south, flight, ~~XXXXXXXXX~~ it's a little closer in pitch and it's not very far off in yaw.

SPEAKER You think the one that's south? You have a question _____?

SPEAKER Yeah. What was the comment I heard about the keeping the LGC up for TTCA.

SPEAKER That's what - I don't know. I didn't understand it either. Control, Flight.

CONTROL Go ahead.

FLIGHT Do we have to keep the LGC up to use the TTCA to go to this attitude?

CONTROL Unless he wants to go over to AGS. He can do it with AGS. But -

SPEAKER Your AGS is not on it.

CONTROL AGS is not on yet.

SPEAKER I suggest doigg it right now and then turn the LGC down.

SPEAKER After you get _____ and then turn it off.

SPEAKER Well, How's he going to maintain an attitude after that?

SPEAKER Okay, we'll just hand control her. You can do that. You have to put the _____ control switches to DIRECT

SPEAKER You think the one that's south? You have a question _____?

SPEAKER Yeah. What was the comment I heard about the keeping the LGC up for TTCA.

SPEAKER That's what - I don't know. I didn't understand it either. Control, Flight.

CONTROL Go ahead.

FLIGHT Do we have to keep the LGC up to use the TTCA to go to this attitude?

CONTROL Unless he wants to go over to AGS. He can do it with AGS. But -

SPEAKER Your AGS is not on it.

CONTROL AGS is not on yet.

SPEAKER I suggest doing it right now and then turn the LGC down.

SPEAKER After you get _____ and then turn it off.

SPEAKER Well, How's he going to maintain an attitude after that?

SPEAKER Okay, we'll just hand control her. You can do that. You have to put the _____ control switches to DIRECT

and ~~xxxxxxx~~ he'll use the 2-1/2 degree switches on that. You don't have to be in AGS for that.

SPEAKER You're going to stand there all night and control the attitude with the hand controller. _____

SPEAKER Well he's got to get a roll going.

SPEAKER Get a yaw going.

SPEAKER Yeah. Yaw. Excuse me.

SPEAKER Okay.

SPEAKER And he's going to have to watch. Yeah, he's going to have to watch it _____

SPEAKER That's the _____equipment _____Jack.

SPEAKER ~~Xxxx~~ Turn that computer off. You'll have to watch it.

SPEAKER And we can watch it for him too, flight.

SPEAKER You may not get it all the time.

SPEAKER Yeah.

SPEAKER Okay. Does everybody understand what we're going there?

SPEAKER No it isn't. We're thinking of TTCA.

SPEAKER Flight, _____

SPEAKER _____

SPEAKER Flight, _____

SPEAKER Go ahead.

SPEAKER He's not going to be able to watch that LGC because you're going to make us go to low bit rate here with this power amp so _____

SPEAKER _____

SPEAKER You're not?

SPEAKER _____

SPEAKER ~~Good~~ Okay.

SPEAKER Flight procedures.

SPEAKER Okay.

SPEAKER Go ahead.

SPEAKER We're going to write a checkpoint here.

SPEAKER Control. Flight.

SPEAKER Control Flight, would you copy this air-to-ground, now, please?

SPEAKER Control.

SPEAKER When you say LM X-axis, you talking about the positive X-axis?

SPEAKER When you say LM X-axis, he's talking about the positive. Out the windows. No. Excuse me. Out the top. Out the top is what he means.

SPEAKER Okay, and you say we're closer to a point in south now.

SPEAKER You say we're closer to a point in the south right now.

SPEAKER Control Flight. _____ Flight. Would you monitor this air-to-ground to the crew, please.

SPEAKER Roger.

SPEAKER Okay.

SPEAKER Flight, _____

SPEAKER Alright. Go ahead.

SPEAKER We have a recommendation here. We'd like under the EPS circuit breakers to bow loads, cross ties on both panels 11 and 16 CLOSE. This is to equalize the sharing of the descent batteries.

SPEAKER Okay. Just a minute. Let me get my control thing going here.

SPEAKER Okay.

SPEAKER ECOM. We got comm now?

SPEAKER We have comm now, but I'm discussing that new attitude with him and I don't think it's any good for us. _____

SPEAKER Yeah. The best they can do.

SPEAKER Flight. Control.

SPEAKER Go.

SPEAKER Which ball is he going to keep up?

SPEAKER Don't know.

SPEAKER Okay. I need some gimbal angles to fly to for pointing plus X axis for the south.

SPEAKER You want to hold that flight for this discussion on comm? We called for an attitude for the Z-axis toward the earth for comm?

SPEAKER Z-axis towards the earth?

SPEAKER Yeah. Now we got ~~xkx~~ a comm problem.with the attitude and the one you probably want is going to give a gimbal lock.

SPEAKER Okay. What do you say?

SPEAKER Well -

SPEAKER - what's the matter with the one we have? Is it -

SPEAKER It's still between the _____, okay? And we're going to really be marginal in this configuration we're going to. So if you want comm, we're going to have to get somewhere up towards foresight on one of those two _____ and then ease into the plus or the minus Z for this pointing at the earth. At either one of those there can be foresight _____ after the forward omnis.

SPEAKER That's strictly a roll from where you - a yaw from where you are, right?

SPEAKER Yeah. We're standing with our plus X this way and we're yawing - rolling - yawing. We get the front and the back side of the LM looking at the earth. We are in the cliptical CSM PTC. And it seems to me that shows the sides

of the LM, if you let Lonnie use that _____

isnt' that right, Ed? Isn't that right? I'm asking.

SPEAKER Well, let me think about it a second, okay?

SPEAKER He's asking about the procedure for shutting it down.

SPEAKER We're getting those, Flight.

SPEAKER Okay, where do we stand on the antenna? Is it okay?

SPEAKER _____ no. I'm waiting for those gimbal angles. He's supposed to give them to me.

SPEAKER He's waiting for gimbal angles

SPEAKER We're waiting for gimbal angles.

SPEAKER From whom?

SPEAKER The back room.

SPEAKER Okay, you want to give him this plan?

SPEAKER Yes. All we want to tell him there is to work less on it.

SPEAKER Flight, FAL. Surprise! The angles that we gave you are gimbal angles; not ball angles. So what he has is gimbal angles to point the nose to the south.

SPEAKER Are they okay? Is he checking them?

SPEAKER _____, Flight.

SPEAKER Go Flight.

FLIGHT I expect you to tell me if I got any problem with Guys sleeping in the CSM relative to CO2, and what I should do about it, right? You working on that?

SPEAKER Correct, Flight.

SEEAKER Flight, INCO. We're ready to go at that attitude.

SPEAKER You go on then.

SPEAKER Right.

FLIGHT _____, Flight. _____, Flight.

_____, Flight. _____, Flight.

SPEAKER Go Flight.

FLIGHT Maryland, I'm being told that leaving the LGC up and doing an automatic PTC saves power - movement saves power by being able to turn the 8-ball off in the inverter. Does that save cooling?

SPEAKER It saves about .7 lbs per hour. It saves a little bit.

FLIGHT What does?

SPEAKER The mode you just mentioned.

FLIGHT Which one? Leaving the LGC up?

SPEAKER Yeah.

FLIGHT Turn the inverters off; saves you coolant water.

SPEAKER Yeah. Anything you power down, Flight, -

FLIGHT Say it again.

SPEAKER Anything you power down will save you a little coolant.

FLIGHT I know that, but we're ~~talking~~ talking about either powering down the 8-ball or the LGC.

SPEAKER Okay, with the AC off, it saves you a little more. It's a little cheaper.

FLIGHT Fine. Okay then, you would think we should go that way?

SPEAKER Rog.

FLIGHT Okay. Do we get the procedure?

SPEAKER And that darkness creates starts at 7633, Flight.

FLIGHT CAPCOM, Flight.

CAPCOM Go ahead.

FLIGHT You may not believe this.

CAPCOM What's that?

FLIGHT But let me let Charlie Duke set down beside you. It turns out that it's cheaper from both the power and the water point of view to leave the DSKY up in the LGC and turn the inverter in the ball off. In which case, they are proposing to do that. The automatic procedure for PTC is being verified in the simulator right now. Don't ask me when we'll know for sure, but sometime. But, even if we don't get that, the guy can monitor to DSKY attitudes rather than the ball and that's what is being proposed and it saves, you know, like an amp.

CAPCOM Okay. In other words, you're saying then that we can also use TTCA with main impulse and the only thing we've got to know is where gimbal lock is?

FLIGHT Yes, and we can see that on DSKY. Can you?

SPEAKER Yeah, you can call off another gimbal angle.

FLIGHT Uh, huh, on the DSKY.

FLIGHT And we're verifying the automatic procedure. Therefore, it seems to me like, we ought to go to the attitude that we want to go to. Get ourselves in the configuration, whenever - and let the guy fly it in main impulse, whenever we get the procedure verified in the simulator, we can radio that up to them, at least the guy that's awake, or if it's two, can take advantage of it and see if he can use it for just one night.

CAPCOM Okay, so what I'm looking for, now, is an attitude to go to.

FLIGHT Yes.

CAPCOM And, I'm awaiting your word to _____ proceed.

FLIGHT FAL and ENCO, have you agreed on the attitude to go to.

SPEAKER Yes.

SPEAKER I'm still checking the ball, Flight.

FLIGHT Wait a minute. For the Cherry?

SPEAKER _____

FLIGHT Afraid of gimbal lock, _____

FLIGHT And some water. And some water.

FLIGHT And we have an automatic PTC procedure being checked.

SPEAKER Say again, Flight.

FLIGHT We also have an automatic PGC procedure being checked in the simulator, Jack. If you think they'd like to know that.

SPEAKER Okay, I'll tell them that, next time.

FLIGHT Okay.

SPEAKER And, I'm wating for the go on this -

FLIGHT So am I.

FLIGHT _____, Flight.

FLIGHT _____, Flight.

FLIGHT _____, Flight.

SPEAKER Go Flight.

FLIGHT Proceed, will you, with your profiles on that assumption that we're going to fly that way and as soon as you can I'd like to

see your water power. _____

SPEAKER Okay.

FAL Flight, FAL, no problem with the ball on that _____

FLIGHT Okay, now the numbers to check has our DSKY gimbal numbers; they're not ball numbers, right.

FAL DSKY is affirmative.

FLIGHT Okay, would you get the ball numbers, too, so the guys will have that as a cross check.

FAL The only difference in the ball angles is the yaw is minus 4.5.

FLIGHT For which case, now.

FAL For pointing south.

FLIGHT Okay. Do you understand that, Jack.

CAPCOM Okay, the yaw is minus 4.5.

FLIGHT On the ball.

CAPCOM On the ball.

FLIGHT And the other angles are the same. Both -

FAL That's affirmative.

FLIGHT - DSKY IMU and ball.

FAL That's affirmative.

FLIGHT Okay.

CAPCOM And you're suggesting south?

FLIGHT Yeah. ~~[illegible]~~ He thinks he's closer to that so he's suggesting that.

CAPCOM And you're saying pitch on the ball is 267.5?

FLIGHT Right, FAL?

FAL That's affirmative.

FLIGHT YES.

CAPCOM Okay, so pitch on the ball is the same as we're going to put in the DSKY, huh?

FAL That's right.

CAPCOM And you want them to load these in with a verb 49? Is this auto maneuver, et cetera?

FLIGHT Control, Flight.

CONTROL Go ahead.

FLIGHT You want to do this auto maneuver or follow the TTCA?

CONTROL I'd prefer TTCA, Flight.

FLIGHT Okay.

SPEAKER And, I've got the DSKY entries here to read to gimbal angles.

Is that on the DSKY. Verb 16 now _____

SPEAKER Oh yeah, okay.

SPEAKER That's good.

FLIGHT And when can we power down the inverter on the ball?

He probably xxxxxxxxx wants to see it on the ball when he

gets there, huh, Jack? And then he ----

CAPCOM You're right. Right.

FLIGHT Anything else we power down there? I guess not for right

now, although we -

SPEAKER Not for now.

FLIGHT _____ thing that we want to talk about.

CAPCOM Okay. You want him to maneuver, you're going to have to call

up verb 16 noun 20, and then you want him to maneuverxxxxx

on the ball to pitch, 267.5.

CAPCOM Yaw minus 4.5. Is that affirmed?

FLIGHT Yeah. Let me get FAL to listen to that. FAL, did you hear that?

FAL Go Flight.

FLIGHT Say it one more time, Jack.

CAPCOM Okay, You want him to call up ver 16 noun 20, monitor to _____ and pitch to plus 267.5 Yaw to minus 4.5 on the Ball. Is that affirmed?

FAL That's affirmative.

FLIGHT Control, you copy all that?

CONTROL Roger.

FLIGHT And you agree?

CONTROL I didn't get to catch the specific number here. You're just a _____ between the ball and the S - DSKY. Is that right?

FLIGHT Yeah. There's - the only difference is in Yaw.

CONTROL Okay.

SPEAKER They're going to call the DSKY up before he starts maneuvering

so that he'll know what to look for in the DSKY as he turns the ball off, then.

FLIGHT Is he?

SPEAKER That's the way I understood it.

CAPCOM Okay. That's a good way to do it. I understand, then, that I'm going to be reading 00 plus 00120 plus 0 - correction - plus 26750 and plus 00450. Is that affirmative?

FLIGHTQ Is that right?

SPEAKER That's affirmative.

FLIGHT FAL says that's right.

CAPCOM Okay, and the CONTROL likes that too, huh?

FLIGHT Control, you like those?

CONTROL They look okay to me,Flight.

FLIGHT Okay.

CAPCOM You ready to go with that, Flight.

FLIGHTQ Yes, we're ready to go with that.

CAPCOM Okay. PGNS auto.

FLIGHT PGNS auto, did you say? or ~~TTCA~~ TTCA?

CAPCOM Okay, you want to maneuver manually, right?

FLIGHT Yes.

CAPCOM Okay.

FLIGHT Now, _____ in Control, Flight.

SPEAKER Go Flight.

FLIGHT Tell me exactly what we want to pull for this inverter in the ball. Okay, Charlie Duke has them here, I think. Would you check with him. Charlie's coming over.

SPEAKER Flight, Comm agrees with all this attitude, huh?

FLIGHT Yes.

SPEAKER Okay.

FLIGHT Control and FAL, copy this, okay?

SPEAKER Roger.

SPEAKER Okay, what's he do then?

FLIGHT _____, Flight.

SPEAKER Go Flight.

FLIGHT When you pull that power that you're talking about, what kine of level are we going to be at?

SPEAKER Ball park around 27 amps or so.

FLIGHT And how - is that good enough?

SPEAKER Yeah. Just barely.

CAPCOM Okay, Flight, Capcom, here. He's going to do that maneuver.

FLIGHT Okay.

CAPCOM And, we've got to tell him what to do after that.

CAPCOM We want him to -

FLIGHT - yes

CAPCOM - hold that attitude to spin a little bit, or what?

FLIGHTQ Yeah, we want him to do a - I guess it's yaw in the LM. Is that affirmed?

CAPCOM Okay, you want him to go what: main pulse, or impulse or, - in the -

FLIGHT Control. What's the best way to do it?

CONTROL Main impulse, would be the best.

SPEAKER Main impulse. He's in there now. Try it that way.

FLIGHTQ We're going to be at 27 amps.

SPEAKER Yeah, I'm looking.

FLIGHT Now you're getting that list of stuff to pull.

SPEAKER Roger. Tell you when I've got it.

FLIGHT Okay.

SPEAKER Flight.

FLIGHT Go ahead.

CAPCOM How about for this PTC spin and rotation if we just stay in attitude hold and pitch and roll. Let the DAP take care of pitch and roll and start to spin right with yaw.

FLIGHT Control, how's does that strike you?

CONTROL Well, I think that's probably the way this - all the procedures are going to be set up, but right now we can't go in and disable this yaw by itself, and the DAP like that work conveniently, and have pitch and roll maintain attitude hold.

FLIGHT Well, what do you suggest?

CONTROL Right now the suggestion is to set it up manually and be in drifting flight or in main impulse and put a yaw in. Okay? And go that mode, there, til we have a little time here to pull ourselves together a little more on ~~how~~ _____ come up with on this auto mode.

FLIGHT Okay. I don't quite understand why you can't be in mode control in the roll-pitch attitude control switches and be in pulse and yaw. ~~What~~ Why can't you ~~be~~ do that?

FLIGHT You know, let the -

CONTROL Yeah. You can't - you're in PGNS, though, Flight. That's the problem, see. Those are only good for AGS and for main ~~impulse~~ impulse in PNGS. They've got to be in mode control for PNGS ~~and~~ operation. If you go to pulse, all that does for you is just take the -

FLIGHT _____ all three axes?

CONTROL No. If you just went to yaw pulse, all that does for you is to take away the PNGS yaw, minimum impulse, and capabilities

is all that does.

FLIGHT Well, look, why don't you tell me how to fly it?

CONTROL Okay.

FLIGHT CAPCOM, Flight.

CAPCOM Go.

FLIGHT And as soon as they can, you know, if they minimize the lighting in the LM cabin, they'll save some amps.

CAPCOM Rog.

SPEAKER Flight, _____

FLIGHT Go.

SPEAKER Okay. [illegible] I want to ask you if you've got a question about the CMP and the [illegible] CSM.

FLIGHT Yes, presumably now we're going to sleep people in the CSM.

SPEAKER Yes, but we would prefer not to do that from a CO2 or a position. We're working on something now, maybe [illegible] someway to stick a LM hose in the CSM to circulate some O2 in there.

FLIGHT Yeah, now that's what I asked you before, what did you want to do to solve that problem. That's what you're talking about?

SPEAKER Yeah. Well you asked if we would want to let him stay in there and the answer is no. We don't want to let him.

FLIGHT Where are you going to put him?

FLIGHT Where do you want to put him?

SPEAKER I guess we'll have to put him in there and just circulate some 02 and that's procedure 1.

FLIGHT _____

SPEAKER Okay.

FLIGHT Control, Flight.

CONTROL Go ahead, Flight.

FLIGHT How - would you talk to the CAPCOM on the _____ systems. None of us over here understand why we can't fly to those mode controls in att hold and the other one in manual.

CONTROL Okay.

FLIGHT I don't understand why -

CONTROL I'll get _____

FLIGHT - we can't do that.

CONTROL Okay.

CONTROL Be there in just a second.

END OF TAPE