NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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PRESS CONFERENCE ON SKYLAB

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FRIDAY, JULY 6, 1979

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The press conference was held, pursuant to notice, in Room 6104, 400 Maryland Avenue, S.W., Washington D.C. at 2:00 p.m.

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PANEL:

William G. Bastedo	NASA
William D. Goldsby, Jr.	NASA
S. Neil Hosenball	NASA
William O'Donnell	NASA
Richard G. Smith	NASA

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ALSO PRESENT:

Denny Baird	FPA
James Dinsmoore	FAA
Robert Gray	State Department
William Smith	FAA
Gus Weiss	Defense Department

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PROCEEDINGS

2:00 p.m.

MR. O'DONNELL: Good afternoon. We are here to discuss NASA planning and activities in the next few days with respect to Skylab. We will be having with us Mr. Richard G. Smith, who is the Deputy Associate Administrator for Space Transportation Systems, and he has been actively in charge of Skylab activities for NASA. Also on the stage at a later moment we will have Bill Goldsby, who has been involved in the program; Bill Bastedo, who has been in charge of organizing the participation of other government agencies in this exercise; and Neil Hosenball, our General Counsel.

In the audience we will have representatives from other agencies who will answer questions with respect to their agency's participation. We have Denny Baird from the Federal Preparedness Agency, Gus Weiss from the Department of Defense, Bob Gray from the State Department, and Bill Smith and James Dinsmoore from the Federal Aviation Administration. I have been reminded that FAA does have a fact sheet available in the back of the room somewhere.

During the period beginning about re-entry minus 48 hours we will be operating a Skylab coordination center on the same floor of this building. In that coordination center will be a closed circuit TV camera that will give people an idea of what kind of activity is going on there and this will be

operated in a fixed position throughout the Skylab activity.

Commentary during the event will be made both from our coordination center here as we get periodic updates from the North American Air Defense Command and as we have other hard information to pass on to the news media. If there are maneuvers to be conducted during the re-entry phase, we would also be getting some commentary from the Johnson Space Center in Houston.

At the time we go active in this coordination center down the hall the room will be off-limits, but following this briefing, if anybody wants to go down and look and see what the place looks like, we will be glad to show you around.

We are going to begin the briefing with a short introduction by Dick Smith. He will show some view graphs and I believe you all have copies in the material that was handed out. Following his presentation, Bill Bastedo will give a short talk on the involvement of other government agencies.

One unassociated announcement here: beginning Monday at 10:00 a.m. and going through 3:00 p.m. we will have video from Voyager II showing some of our close-up television from the planet Jupiter. This would be a press event -- a press only event here.

Transcripts of this briefing will be made and we hope to have them available in printed form by Monday.

And with that, I'd like to introduce to you Dick

Smith.

MR. SMITH: Thank you, Bill. Looking over the audience, I think I have talked probably almost to each and every one of you once or twice or more times in the last two or three weeks.

It seems that we are now finally coming to the last few days of Skylab. Predictions this afternoon still show the 11th of July as the more probable date with a spread, plus or minus one day, around that. So, sometime between the 10th and the 12th Skylab will come to its end after being launched in May of 1973.

To set the stage, I would like to walk through charts that most of you have seen probably more times than you'd like to, but I like to -- perhaps some of you have not -- follow up with some additional information and discuss some of the highlights as we go along. So, if we could kill some of these TV lights a few minutes so that we can take a look at these charts ...

(Slide)

MR. SMITH: This first chart depicts the configuration of Skylab as it stands today. Also, the artist's rendition on the side is probably a little more pleasant to look at. As you know, we are under control -- active control -- at this point in time in a torque equilibrium attitude. We maintain control by two sources. Two large control moment gyros are

still functioning -- one failed during the primary mission -- and six gaseous nitrogen thrusters at the aft end of the vehicle. Now, this control allows us to point the vehicle. It does not allow us at all to vector it around and change its velocity in any direction. So, we are able to rotate the vehicle and that is all.

So, with that type of situation, the only force that is available to us to do anything during the final hours is changing its attitude and have some effect on the drag of the vehicle and thereby, under certain conditions, we can have some effect on where Skylab will come down and I will talk to that a little later. Next view graph please.

(Slide change)

MR. SMITH: I think it is appropriate to think back a few minutes on what Skylab was like initially. You remember it was visited by three sets of crew, three men each, the last of which stayed in Skylab some 84 days. We did have on board some 50 scientific experiments. The largest thrust was solar observations, followed by earth resources, the evaluation of man's capability to live for a long period of time in space, and some very preliminary space processing experiments.

Even though the program got off to a rocky start when the meteoroid shield came off and ripped off one of the solar arrays and damaged and jammed the second one -- or, jammed it; it didn't damage it so much; the mission was really

salvaged not only by the control for the few -- 10 days prior to the men getting there but also by Pete Conrad and his crew.

In the end results we exceeded in every case the criteria for a successful mission. We actually got scientific knowledge and information and engineering information beyond our expectations. So, Skylab was a complete success.

When it was placed in orbit, it was placed with the understanding that at some point in time -- at that time we were projecting late in the 1970's or early 1980's -- Skylab would re-enter naturally and break up and decay in to earth. That fact seems to have been lost somewhere along the line by the general public and by quite a few of the media. So, I want to repeat that the fact that Skylab is now re-entering is not a surprise to us at all.

I think what probably has confused the issue a little bit is that in the intervening years we did attempt to build a device to be carried up in shuttle -- that was called the teleoperator retrieval system -- and its first job would have been to rendevous and dock with Skylab and either push it to a higher orbit for possible re-use or a controlled re-entry into the ocean somewhere. The solar activity which has caused Skylab to re-enter earlier than we were predicting at that time, coupled with some slippage in the shuttle -- we were on a non-converging schedule and the first of this year we abandoned that project and we had to revert back to the initial

plans of the base program which was for a natural re-entry. Next chart please.

(Slide change)

MR. SMITH: This is an artist's prediction of what will probably occur. We think somewhere between 55 and 65 nautical miles we will start break-up. Solar arrays will be the first hardware that break off, probably followed shortly thereafter by the Appollo telescope mount -- this section of hardware -- and then, following that, a general degradation of all the hardware. And we expect roughly two-thirds of the equipment to be -- of the mass to be consumed by the heat of re-entry and the remaining part to be approximately 500 pieces that will survive and contact the earth. We have talked many times about the size of those pieces and I don't think we need to go into that today, but remember the fact that this debris will be scattered along a track some 4,000 miles long and approximately 100 miles wide.

I think it is also important to remember that you are talking about 500 pieces that will be scattered over 400,000 square miles and the heaviest concentration at any one area is approximately three pieces in 100 square miles. So, in no case are you talking about a rain of debris over a locality.

As we have stated earlier, the many times that we have calculated that, on a random re-entry basis of coming down anywhere between 50 degrees latitude north and south the

chances are roughly one in 150 -- precisely one in 152 -- that Skylab may injure person somewhere. Another way to say that is to be reasonably sure that some person might be injured, you would have to put 150 of them up. Another way to look at it, since there are 4 billion people, my personal chances have been roughly one in 600 billion. So, the same data three different ways ... Next chart please.

(Slide change)

MR. SMITH: What can we possibly do -- and I talked about drag modulation a few minutes ago and let me describe what that is and how we would use it. Next chart.

(Slide change)

MR. SMITH: Today we are at roughly 135 statute miles and 119 nautical miles. We are decaying at roughly 2.00 to 2.25 nautical miles a day and we have -- we were successful about two weeks ago in placing the vehicle in what we have called a torque equilibrium attitude. Prior to that time we were in a solar inertial attitude where the solar arrays pointed to the sun at all times. Now, had we left it there, as we got into the higher aerodynamic forces, the vehicle would have tumbled and we would have lost any opportunity to have any effect during the final hours. By changing its attitude and effectively finding a trim position or a balanced set of torques, we have been able to control the vehicle and believe we can probably control down to probably 70 to 80

nautical miles. Now, next chart.

(Slide change)

MR. SMITH: That attitude happens to be effectively broadside of the direction it is flying, so a very high drag. If it turns out that we project the impact, here depicted by the dotted line, might impact an area of the earth or a group of orbits with a population density that is higher than the world average, it is possible to maneuver the vehicle to a low drag attitude or almost an end-on attitude and hold it for a period of time and allow the vehicle to fly for several hours longer and several orbits longer and then you're projecting re-entry on another group of orbits overflying a different portion of the world. And, if that is overflying less population, you can decrease the worldwide risk. Next chart.

(Slide change)

MR. SMITH: This chart depicts what we mean there in that the initial orbits would have been those shown farther to the west -- to the east, excuse me, any, by delaying re-entry, you progress orbit by orbit about 22.5 degrees to the west. So, you can see, if you hold four or five orbits, you can change dramatically the portion of the world that you are overflying. Next chart. What's available to us? Go on to the next chart please.

(Slide change)

MR. SMITH: We'll know the condition of Skylab. We

will know do we have an adequate power system and are our CMG's working. We'll know how much of the nitrogen gas we have on board. We'll also know what capability we have of how much a maneuver we can make. We'll also know where our command sites are and when we'd have to make commands. We would have, within certain bounds, a prediction of the remaining time to fly; and that prediction, based on numerous bodies that have re-entered from calculations made by NORAD, is roughly accurate to plus or minus 20 percent of the time to go. So, if you talk about roughly 24 hours, you're talking about around five orbits or something of that nature.

Then what we've looked at is: can we predict the hazard or the risk and is there a set of conditions whereby you can improve that? Next chart please.

(Slide change)

MR. SMITH: What we have done in that is we have taken the geographical areas that Skylab overflies between the latitudes of 50 and divided them in equal areas and have determined the population of each of those areas as current as is available; and then we have plotted and determined what the population is under, you might say, each possible orbit. Next chart.

(Slide change)

MR. SMITH: This depicts 16 orbits of a typical day. And what we have done is determined the population under each

orbit roughly 40 miles each side of that and have varied that orbit basically one-half degree ascending crossings. So, we have looked at basically 720 tracks. Next chart.

(Slide change)

MR. SMITH: In order to work with that, we've normalized that data. We've said that we've given an index of 100 to the revolution or orbit of highest population. That happens to be a crossing of 293 degrees east and has 156 million people in it. We arbitrarily said that's the scale of 100 and we ratioed everything else down from that. For example, the crossing at 90 degrees has 92 million people, is 58 percent or has an index of 58 of the worst situation. Next chart please.

(Slide change)

MR. SMITH: We've taken that an plotted it by hazard index and the ascending node crossing. You'll notice there are two large peaks involved. If you look at the average situation, it turns out -- you really can't see it on this scale here, but it turns out to be about 34 in this area right here. So, that would really correspond to a worldwide risk of roughly one chance in 150. Above that would be a greater risk and below that, substantially less risk.

If you look at it and calculate what the chances are for the very worst situation, that turns out to be -- the risk goes up from one in 150 -- the chance that someone might be

injured somewhere -- to one in 50. And at the best possible orbit that drops to one in 1,500. So, it gets worse by a factor or three and gets better by a factor of 10.

So, what we've looked at is: can we maneuver from the high population densities to the low population densities and thereby reduce the risk? In order to explain that a little better, let me go to the next chart.

(Slide change)

MR. SMITH: Since Skylab basically, on a typical track, moves westerly 22.5 degrees approximately each orbit, if you were, say, flying on this orbit we've numbered 5 here, you'd overfly basically what represents this many people or this hazard index. The next later orbit, that risk would have dropped to this level and subsequently on down. You do not overfly the population listed by here. We drew it this way because, at the time we were working on this, we didn't know exactly what those ground tracks were. It could have been here, it could have been over here, and it could have been this place.

What we have also determined is that if we make a maneuver, we do not want to put ourselves in the position of making the situation worse at any time. For example, say I wanted to maneuver from this orbit down to here, I basically want to go one, two, three, four, five revs and that's the minimum risk that I can come up with on that particular situation; and each subsequent rev or fraction thereof, the risk is

reduced.

On the other hand, if I happen to be overflying and predicting along this orbit, the next single orbit situation would have been worse. If we had failed and not made this maneuver and only made this much change, we in fact would have increased the risk; and, under those situations, we would not make a maneuver.

So, we've adopted what we've called a fail/no worse philosophy that is the paramount criteria to any maneuver change. Next chart.

(Slide change)

MR. SMITH: So, in principle, what we've said is that we'll consider a maneuver if the risk is greater than the world average, our improvement can bring it down below world average, we must have a substantial improvement, probably 20 percent, and that a failure would not increase the hazard. And, of course, the vehicle's health would have to be satisfactory. If all of those situations were fulfilled, then we would attempt a maneuver.

Now, we've set this up, as we do in all our programs, with fixed mission rules. The flight controllers and the people supporting them, both in Houston and in Huntsville, have those rules and would proceed along that line unless they were told to stop by Dr. Frosh. We do not have any criteria today that he would make a determination to stop, but in all

maneuvers of this type we always have the built-in time where, if some unforeseen situation came up, management would have the perogative to say, "no, let's not do that." Next chart please.

(Slide change)

MR. SMITH: When you talk about that in general words, it comes down to specifics and it really says that if you're overflying a group of orbits indicated here by the shaded area that overfly southern Europe down across India and Chine -- those are the heaviest population areas -- we would attempt to maneuver it to four or five orbits later to a group of orbits that would be overflying Canada, United States, down across the Atlantic Ocean and maybe across the edge of Africa. Those have a considerably less risk to people than the other things. So, what we're doing here is attempting, on a worldwide basis, to reduce the risk.

Okay, so there's kind of the philosophy of where we are starting and what our situation is. Now let me talk a little bit about what's going to be happening the next few days and the information that will be provided to you as we receive it.

I think, as Bill O'Donnell pointed out, we will be manning the coordination center at 48 hours prior to predicted re-entry. We'll be manning it around the clock from that time on. We'll be putting out information to the press and through the State Department to foreign governments as we receive that

information. If we're contemplating a maneuver, you'll be informed that we are considering a maneuver. If we start a maneuver, you'll be told that it has started and will be statused as we go along.

For example, you could be maneuvering in the neighborhood of 10 to 11 hours holding in the low drag attitude. We won't know that the maneuver is completely successful until that period of time is up, but we'll tell you that we've gone into the new attitude and, as we get data that the vehicle is stable and the attitude is holding, and when we finished that maneuver and we have tumbled the vehicle at that time, we'll tell you that that's occurred; and at that time we'll be projecting what the new impact areas and the zones are.

So, we will be giving out all the information that we really have.

Now, we're just a few days away from the actual event, so today we can really show you in a reasonable degree of accuracy what ground tracks Skylab will in fact be flying over on the 10th, 11th and 12th of July. Now, these tracks may shift slightly, depending on the rate of decay of Skylab and the period of its orbit; but I don't expect them to shift more than, say, a half a degree of latitude -- of longitude, excuse me, at the equatorial crossings. Could I have the next chart please?

(Slide change)

MR. SMITH: You've been handed or given copies of three days of the ground tracks. This is the information for the 11th of July. And, principally, if you're not in close proximity to one of these tracks, there's effectively no chance of any Skylab debris coming in your area. You'll notice that on those three days that it's almost impossible to distinguish the difference in the ground tracks. Alot of you have followed Skylab during its mission and remember that we repeated the ground track basically every five days and at that time we had a period, if I remember, of about 93.25 minutes or something like that. And now we are down to slightly better than 88 minutes or close to 90 minutes. I forgot which. The period has changed. So, we're actually in an altitude and an orbital time now that we almost get a complete repeat day by day so we are effectively flying, you might say, an even 16 orbits per 24 hours.

You'll notice along here the time of the ascending crossing. The period is roughly 88 minutes. So, if you're here at this time, 22 minutes later you're at this point, and 22 minutes later here, and so on. So, it's relatively easy to determine the time of first exposure to a possible piece of Skylab debris. The period of exposure is approximately 40 minutes from the earliest possible time a piece could come to a specific point to the latest time to a specific point. So, figuratively speaking, here at 1111, if you're at that point,

you'll be exposed from 1111 to 1151. Okay?

Now, as we get into the actual information -- could I have the next chart please?

(Slide change)

MR. SMITH: -- we will start putting out these types of charts which show the same ground tracks. They will show any shift that we've had due to timing and the length of that track where possible debris could come down. This one is at 12 hours and you'll notice we at roughly three orbits. Again we'll show the longitudinal crossings and the times. We'll probably end up putting times at quarter revs on there when the same information is available. Next chart.

(Slide change)

MR. SMITH: As that gets down to six hours, that length of time has decreased because of our prediction accuracy. Next chart.

(Slide change)

MR. SMITH: And we think the last piece of data that we will be able to get reliably will be at approximately two hours and you'll be talking about a ground track slightly over halfway around the world.

Now, the question is often asked: well, if you're under that track, what should you do? The risk is a very minimal risk -- to being injured -- so we'd like to caution people not to take an overt action that would put themselves

in more danger than Skylab is to begin with -- automobile accidents, something of that nature.

It turns out, if you consider a family dwelling, that lmost half of the pieces are stopped by the roof. Another percentage of that is stopped by the first floor. So, if you have got a two story house or a single story house with a basement, you do pick up a degree of protection by being in the lower floors. That's somewhat offset by the fact that, if a large piece were to hit that house, it would penetrate those floors and there would be flying debris. So, potentially in a house under those circumstances you're better off outside in a near miss than potentially inside in a near miss. So, it tends to offset a little bit the benefit of being in a normal house. The bottom line is there is a slight additional degree of safety by being in a normal family dwelling; and, if it's convenient to be there and you are concerned about it, by all means go inside but don't take an overt action and a risk and rush home from the supermarket or something like that and expose yourself to a greater danger with some other cars.

On the other side of the coin, if you consider a multi-story apartment or office building with a concrete roof, you get a considerably greater degree of protection. Almost all the pieces are stopped by the roof. There are a few pieces that would go through the roof and a couple of pieces that might go through the floor just below the roof. So, if you're

down a couple of floors from the top of a multi-story building with a concrete roof, you've got very good protection and that is a logical place that you could go and would be afforded some protection.

The information that we will be receiving from NORAD -- we will be getting an update in these predictions at roughly 48, 36, 24, 18, 12, 6 and 2 hours prior to entry. Now, obviously, if we make a maneuver, we'll be flying several hours longer and those times will change somewhat; but we will be furnishing in this room the information that I have shown you as we receive it. We'll also be furnishing that via the State Department to foreign governments and, obviously, any foreign press that happens to be here. Also this information will be furnished through the Federal Preparedness Agency and will go out to the local Preparedness people. As well, the same information will be furnished to the FAA who does have plans to divert aircraft.

I think that is a snapshot of what I've got; and, before we open it for questions, I think we ought to get Bill Bastedo and then the four people that are scheduled to be at the table will all receive questions at one time.

MR. BASTEDO: We've been coordinating with many other Federal agencies for the last, oh, six to eight months to plan for the re-entry of Skylab; and, basically, we've had heavy involvement from the State Department, the Department of

Defense, the Federal Preparedness Agency and the Justice Department. NASA is the lead agency and is directing the coordination center here. We'll work with the other agencies. They will be present in the coordination center.

The State Department, of course, is responsible for the interface with the foreign governments through our embassies located throughout the world. As updates are received, they will be voice transmitted to the State Department, who will in turn immediately re-issue them worldwide. The embassies will be in touch with their host governments. Likewise, if, in the unlikely event, any debris does impact in foreign countries, our embassies will report back and we will get the wheels in motion to render any assistance we need to.

The Department of Defense has been very helpful to us. They have, of course, tasked NORAD to provide the tracking information to us, supplementing the normal NORAD sensors with other Department of Defense radars.

In addition, we'll count on the Department of Defense for any airlift requirements we might have and also for providing either medical or engineering teams from their worldwide resources in the event of foreign impact.

The Justice Department, of course, has helped us in preparing for any claims preparations we might have.

The last agency, of course, is the Federal Preparedness Agency and they are responsible for the

coordination of Federal, state and local efforts in the event of any debris impaction on states. In addition, they will, through the Defense Communications Preparedness Agency, provide a reporting network so that rapid information can be provided back to the Skylab coordination center.

That's basically how we have worked with the other agencies and will work with them in the next week.

MR. O'DONNELL: While these gentlemen are arranging themselves on the stage, I want to make a couple of other announcements. Beginning next week, when the coordination center does open, this room here will be the press center -- the news press working area -- and we hope that it will be restricted to press and that other people, both from NASA and outside, would not be coming in here and distracting the people that are working.

During the event, also, we will be getting a display map over telephone lines. This display map will be the large map that many people are used to seeing in the large mission control room at Houston. It will be transmitted up here in slow scan black and white, but it will be able to give the story of where Skylab is at any given moment, plus the various areas that are candidates for re-entry area.

And, with that, we will open to questions. I would ask you to please wait for microphones because we have colleagues waiting and listening in at other centers.

QUESTION: Can you give us the odds for drag modulation working?

MR. SMITH: I think there's kind of two answers to that question. There's roughly --

VOICE FROM THE AUDIENCE: Repeat the question.

MR. SMITH: The question was: what are the chances of drag modulation working? I think there's two answers to that. One is: there is probably about an 18 to 20 percent chance that you would meet the criteria that I depicted on the screen. I think, if that condition is met, though, I personally have a pretty high confidence that drag modulation in fact would work. There is some risk to that from the standpoint that I personally had about maybe a 50 to 60 percent confidence that the maneuver -- the torque equilibrium maneuver -- that we did a couple of weeks ago would work. It did work. We are going to a new torque equilibrium attitude to hold the low drag. There's a chance that that would fail and tumble, but, based on our previous experience, I have reasonably high confidence that it would be successful.

QUESTION: But only an 18 to 20 percent chance of its meeting all those criteria?

MR. SMITH: That's correct.

QUESTION: Thank you.

QUESTION: I was enlightened by the fact that you said at one time early on in the program you had planned upon

Skylab decaying naturally. Did you at that time anticipate the problems that you're now encountering and is that why you decided to go ahead with other maneuvers?

MR. SMITH: Well, over the years, we have -- the calculated risk of roughly the one in -- the one chance in 150 that someone may be injured -- that number has fluctuated a little bit, but, you know, maybe -- I think at one time it was down to the 50 to 60 category and it is now as high as one in 150. So, in essence, it has not changed; but over the years we have kept in mind, "is there any additional use for Skylab?" That was one of the major considerations for the TRS system. Recognizing that, yes, it is a small risk but is a finite risk, is there anything that we can do to minimize that risk? And, as we have studied the thing further, we have uncovered some things. Six months ago this drag modulation idea was just a fond hope in a few people's minds and alot of us, just frankly, didn't believe it could work and it appears now that it will.

QUESTION: Roughly when would you perform the maneuver and how late could you wait?

MR. SMITH: Depending upon the amount of time we need and how many orbits. We'll be doing it in the 12 hour time frame.

QUESTION: 12 hours before re-entry?

MR. SMITH: Yes.

QUESTION: Is that the latest that you could do it?

When do you lose control of the spacecraft? I guess that's probably the question.

MR. SMITH: We lose control of the spacecraft down at probably two hours or something like that.

MR. GOLDSBY: In the neighborhood of 70 nautical miles. That's two to three hours before impact.

MR. SMITH: But we'd have to do a maneuver or plan a movement much earlier before that so that we would be able to have ground stations to uplink the commands and we'd have time for the low drag to have some effect.

QUESTION: Two quick ones please, Mr. Smith. One, will there be any representatives of any foreign governments in the Skylab coordination room during the re-entry process?

MR. SMITH: No, there will not.

QUESTION: The second question is: can you give me an arithmetical guess on how many square miles there are between 50 degrees north and 50 south?

MR. SMITH: No, because I don't know.

(Laughter)

QUESTION: Dick, do we assume that 12 hours is the earliest -- or, the latest you get an accurate prediction of where your footprint will be? You say you start your maneuver then?

MR. SMITH: We will be putting our predictions starting at 24 hours and there you're talking about roughly five

revs and as it comes down closer and closer. We'll be putting out those as we get them. The latest, as I said, I think will be at two hours.

QUESTION: If the 12th is the day of 50 percent confidence window day, what hour eastern standard time on the 12th are you predicting impact?

MR. SMITH: It's the 11th and it's roughly 3:00 p.m.

QUESTION: I'm sorry, the 11th.

MR. SMITH: Yes. That brings up a good point. I'd like to make a point here. When we get predictions from NORAD, we do receive a time and an error band around that time. As you notice, we did not on any of the charts I showed put that specific time. We think that is indicating an impact point and is an improper implication. There is a broad band of uncertainty and we feel the appropriate thing to do is to put out that band of where Skylab could come down. If you go back and look at the previous studies, it is very rarely that you are on that specific time that's been predicted. You may be near it, but you're not on that time.

QUESTION: The 3:00 p.m. -- is that GMT or is that eastern?

MR. SMITH: That was eastern. That's is before any maneuver.

QUESTION: What is that the time of, Dick?

MR. SMITH: The question was: based on today's

predictions, when is the -- at what time on the 11th is today's prediction? The time comes out to be approximately 3:00 p.m., but we are talking about plus or minus several orbits here. So, 3:00 p.m. is a false piece of information. You're talking about probably some time early morning to late evening. It's plus or minus a day right now. So, 3:00 p.m. -- you know, that's the time that the calculations come out. You're fooling yourself with that date -- that information.

QUESTION: Two questions. One for Mr. Smith: I'd like some kind of details on the deployment teams. And a question for Bob Gray from the State Department: an assessment about international reaction and concern about Skylab so far.

MR. SMITH: Well, we have identified five teams of people made up of five people each, three technical people, one counsel and a public affairs person. These people would be deployed if we had a reported damage or casualty. We would deploy those teams to assess that damage. One of their first functions would be to verify that it was Skylab and immediately put the wheels in motion with our counsel to start the process of any damages being settled.

MR. GRAY: We've been in contact with a number of foreign governments, passing information to them on Skylab. I'd say that for the most part the reaction has been very mild and moderate and basically consists of requests for additional

and a real desire to get as much information as they can on a real time basis.

QUESTION: It seems on these three orbital traces you've given us there are wide areas of the world you could just about rule out right now, like large areas of the southwest United States and Africa and South America. Have you got any better maps of this so we can maybe tell somebody that they are safe right now?

MR. SMITH: We haven't processed any more right now. As we work this information and feel a little bit more confident about the actual longitudinal crossing points, we'll put that out. You're principally right: there are large areas right now where the chances of Skylab debris is nil.

QUESTION: When you get your predictions, in what form will they be? How will you tell us? "We predict it's going to land on Cleveland tomorrow" or --

MR. SMITH: No, as I showed in the charts, we will put out a map with the ground trace along it and the zone along that ground trace and the times when possible debris could come down. That's the information that we have.

QUESTION: Is it possible that you'll never know where the debris fell?

MR. SMITH: Yes, very definitely. It could very easily go out of sight of one of the NORAD radars and the next time it's supposed to be seen it's not.

QUESTION: What do you suppose the chances are of that happening?

MR. SMITH: I frankly don't know.

QUESTION: Can you tell us from the maps as you have them now what some of those areas are that appear not to be endangered at this point?

MR. SMITH: I personally have not had time to sit down and analyze those predictions. I received those maps this morning from the latest tracking information and I just have not had time to go through and analyze those maps.

QUESTION: This may be a little bit tedious for you, but I understood you to say in answer to Dick Lyons' question in regard to 3:00 p.m., July 11th that that was a possible date or a possible time for the impact. Then, in response to Peter Hacket's question I understood you to say that that really was not a very good time at all. Would you mind going over that again briefly?

MR. SMITH: Yes, the prediction at this point in time -- well, all that we're allowing is -- the accuracy is plus or minus 20 percent of the time to go and that's roughly 24 hours right now. So, that 3:00 p.m. date could be anywhere from 3:00 p.m. the previous day to 3:00 p.m. the next day; and that's a pretty broad spectrum. So, don't lock in on that 3:00 p.m. as the time. It's somewhere in that period of time.

MR. GOLDSBY: Also, the 3:00 p.m. turns out to be

the center point of that uncertainty band Mr. Smith discussed. It is no more than 50 percent of the way into the uncertainty.

MR. SMITH: So it really says that there is a 50 percent chance it will land before that time and a 50 percent after that time. So, don't lock in on that time.

QUESTION: Dick, can you give us an estimate of the period of time during which various -- can you give us an estimate please of a period of time during which debris might fall from the first one -- just a guess, I'm sure.

MR. SMITH: Roughly 40 minutes.

QUESTION: In other words, from the first impact to the last?

MR. SMITH: If you take a specific point that you happen to be located at, from the time the earliest piece could land there to the latest piece to land there is 40 minutes. Of course, that takes a family of break-up times and the whole big long 4,000 mile footprint, but that's 40 minutes.

QUESTION: If anyone finds a piece of Skylab, do you want it back?

(Laughter)

MR. SMITH: We're not going to search for the pieces of Skylab. As I've said, if there is a claim, we will want to verify that it was Skylab and not something else. It turns out that it is very easy to indentify an object that's been in space. The high energy particles that penetrate it in orbit

give an extremely low level but characteristic radiation type background -- no radiation for anybody to be worried about. There is probably more in this paper. But, it's very easy to determine that. I have been a little concerned, frankly, about the number of radio stations and so forth that are offering rewards for the first person that brings in one. If there is no damage associated with it, we're requesting the people to send it to NASA and we would verify it. If we determine that we should keep that, we would reimburse them for the shipping.

(Laughter)

QUESTION: I was asking a semi-serious question. How will you verify a piece if it falls on the other side of the world or on this side of the world.

MR. SMITH: We have to obviously examine the piece.

QUESTION: Will you go to the piece or will the piece go to you?

MR. SMITH: It could be either way. If it's just a verification and just minor damage, rather than to send a team of people, we'd probably ask that the piece be sent to us and negotiate that. The teams are equipped in most cases to be able to identify them on the spot. If it is a piece of any size, there very probably will be a part number on it and it would be very quickly identifiable as a part of Skylab. If there is not and it is just a molten ball of metal, we might

have to -- the extent of verification might be, "has that object been in space?"

MR. O'DONNELL: We have an associated question from Huntsville. Who owns the pieces when they hit the ground?

MR. HOSENBALL: I can probably answer that. There is an outer space treaty which has also been ratified here, so it's the law of the land, and, under that treaty, anything that goes into space -- you retain ownership whether it's in space, whether it's on the moon or whether it's back on earth. So, from a legal standpoint, we still own it; but, as Dick says, the chances are we're not going to ask for every single piece to be returned to us.

QUESTION: I'm going to ask this question, knowing that there could be a great variance in the initial impact point that you're predicting and that you are using the 11th at 3:00 p.m. as a guide: now, can you tell me whether that date and that time is over land or over water and where would it be?

MR. SMITH: I personally can't tell you because it is so far downstream we haven't even started making the calculations. I'm sure that somebody has looked at that, but I don't really know. Right now I have not had an opportunity to look at that. I think it is a meaningless date right now.

QUESTION: Why put it out then?

MR. SMITH: I responded to the question. I did not

volunteer that, because I think that the spread of time is such that it is such a broad variation that it could be misleading. People can interpret that time as an impact point and that time does not mean an impact point at all. It means the midpoint of a set of predictions of when the debris could come down or when Skylab could re-enter and I think it should be treated that way.

QUESTION: Question back here: am I correct that the -- am I correct in assuming that from the point of estimated entry or impact the maneuver would add time only? There is no way, in other words, from that estimated point you can subtract time and bring it in any earlier; is that correct?

MR. SMITH: That is correct. We would be changing from a high drag to a low drag attitude, thereby adding time.

QUESTION: Have you taken any steps or will you take any steps to alert Russia of the possibility that Skylab is or is not a missile headed in their direction?

MR. BASTEDO: They know the orbits of Skylab as well as we do and our embassy in Moscow has informed officials of the Russian government of the projected re-entry date of Skylab. So, I'm sure that they are not going to consider it as an incoming ICBM.

MR. SMITH: After all, you know, it is not a new object.

QUESTION: Dick, you mentioned it would take 40

minutes from the time the first piece impacts to the last piece. How long will it take for the first piece to impact after it breaks up?

MR. SMITH: I remember 20 to 30 minutes. The 40 minutes is the spread of time at any specific point when debris could come down.

QUESTION: Mr. Smith, this may not get us anywhere, but let's go back to what Ike Paba said about 3:00 p.m. See this that you showed us? It shows your track and so forth. It shows 1111 Zulu, which is 3:00 p.m. eastern.

MR. SMITH: Yes.

QUESTION: It goes over Washington.

MR. SMITH: Well, that's --

(Laughter)

QUESTION: Right? So why don't you just take one of these things and show us a scenario just for one time down so we'll know how to use the map?

MR. SMITH: I think, really, the -- well, let me try that. 1700 Zulu is about 3:00 p.m. But if you take the heavy track -- and I happen to have the map in front of me for July the 10th. If you take the heavy track that starts up at roughly 120 degrees west longitude, that starts out at 1140 Zulu and there is four hours difference between eastern daylight time and Zulu. 22 minutes later you would be up at 50 degrees latitude at the top of the sinusoidal sweep there at

roughly 30 degrees; and, 22 minutes later, a total span of 44 minutes, you would be on the descending crossing at the equator; and, again, roughly 22 minutes later, at the apex at the bottom; and then back up at 1308, at the crossing of the equator again. So, you can ratio along that line as to where any general area -- where a track might be exposed.

Now, let's say -- when we get into the real time situation and we start putting out the maps that we showed -- that now only have a few traces -- we'll be putting more times on that and it will be easier to work with I think.

QUESTION: Two questions. The width of the actual footprint is projected at 100 miles plus or minues 45 miles. What is the actual width of the overall risk pattern including errors in projecting where this will fall?

MR. SMITH: The debris will go roughly 50 miles to either side of the path that Skylab is flying over.

QUESTION: The suborbital plot?

MR. SMITH: Yes. And that considers wind drifts and everything else on debris. Right now we could probably shift a half a degree due to orbital timing between now and the time of the actual ground traces next week.

QUESTION: Okay. Second question: since the press seems to be having trouble using these maps, is there any chance of getting out a schedule, a computer printout, that would tell people right off, "if you're under the track of

this thing, here are the times when pieces could hit you"?

MR. SMITH: We might could do that in a limited degree. We might could handle it, say, on cities maybe above 100,000 population or something of that nature. Going to a finer grain than that -- we wouldn't have the capability to do it.

QUESTION: Could you do it in terms of latitude?

MR. SMITH: I'd have to look and see what that would involve before I could answer that question and I'll be happy to take a look at it.

QUESTION: You said, in answer to an earlier question, that you believed there were some areas of the earth that could already be eliminated or considered safe and you didn't have that information available now. Since I suppose it would be a great relief to many people, is there some way you could get that information in the relatively near future?

MR. SMITH: Well, what it would be a matter of doing is taking those ground traces right there and putting them on a larger map so that there is a greater degree of fidelity to it. That represents the map, as it stands right now, on this scale and it would have to be done on a finer scale. That's what is involved.

QUESTION: Two quick ones. One, first, to Mr. Hosenball: would you please restate, sir, the level of the United States liability in the event of damages?

MR. HOSENBALL: Well, there are -- well, putting it pretty much aside and making it quite simple, there is an international convention on liability for space objects returning to earth; but it has become pretty immaterial because basically what we have said is that under the NASA Act we will pay any claims arising out of Skylab and pay damages for those claims based on our own statute which is a meritorious claims statute and we are going to try and process those as quickly as we can.

I -- Dick did say something -- that we were going to have the people on the scene immediately. Well, that is going to depend, one, on how many places it falls and what damage is caused. It will be dispersed and we don't have the people to send all around. And I think the chances are, as far as any emergency relief that is required, that is what the Federal Preparedness Agency will coordinate with local governments and they will take care of immediate needs and we will try and process those claims and get people there as fast as we can.

QUESTION: The next question -- and final -- is to Mr. Goldsby: sir, with your knowledge of the stores on board and the systems on board, what is your estimate of the heaviest item that is going to make it to impact on earth?

MR. GOLDSBY: Well, as you well know, I'm sure, that is a function of very complicated analysis. The result of analyses that have been done shows that the heaviest piece

would not exceed 4,000 pounds.

QUESTION: That specifically is -- specifically, is that --

MR. GOLDSBY: That's the film ball -- I'm sorry; the heaviest piece could be the shroud and that does approach in fact 5,000 pounds.

MR. O'DONNELL: Do we have any other questions here?

(No response)

MR. O'DONNELL: Thank you very much.

(Whereupon the press conference was concluded at 2:58 p.m.)

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C E R T I F I C A T E

This is to certify that the attached proceedings of the National Aeronautics and Space Administration, press conference on Skylab, held in Room 6104, 400 Maryland Avenue, S.W., Washington, D.C., on Friday, July 6, 1979 were held as herein appears and that this is the original transcript thereof.

Neal R. Gross

NEAL R. GROSS

S19-10191

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ANNIVERSARY OF APOLLO 11 MOON LANDING

PRESS CONFERENCE

JULY 20, 1979

Participants:

Neil A. Armstrong

Dr. Edwin E. Aldrin, Jr.

Michael Collins

Robert E. Newman, Director of NASA Public Affairs

(This transcript was made from a tape provided by the National Aeronautics and Space Administration).

MR. NEWMAN: We turn now to Neil Armstrong.

MR. ARMSTRONG: We mark today the 10th anniversary of America's reaching its goal of landing on the moon. The interim ten years have been interesting ones in space, marked first by the spectacular successes of the Apollo landings of 12, 14, 15, 16 and 17. The middle of the decade marked by further manned flight and Skylab and the first joint venture with the Russians, Apollo Soyuz. And the latter -- really all the decade, marked by remarkable achievements in exploration of our nearby planets, most recently of course, by the Jupiter encounter, which brought us the spectacular picture of Jupiter's moons.

UNIDENTIFIED PERSON: We can't hear you.

MR. ARMSTRONG: O.K. I'll try. So, in retrospect, I think it's a decade in which we can be very proud. A great deal was accomplished. Certainly not everything was accomplished that we might liked to have seen. A lot of things, a lot of projects that were gleams in the eyes of some enthusiasts, did not occur and will have to wait for the next decade. But we can hope that the next decade will be marked by equal or even more striking progress, with the first flights of the shuttle which we look forward to with great anticipation. And as I previously said, I hope that leads to a number of other projects including particularly, a permanent space station. I'll turn it over to -- who's next?

MR. ALDRIN: Good morning. I'd like you to know that this is not my favorite pastime. And I get kind of nervous and uptight at affairs like this. But that's O.K. because it's not going to last forever. In the past several years, I've really felt sorry for a few individuals. One of them happens to be the people in the Post Office in Los Angeles. They keep sending things to the wrong address and they have to forward them, so if you gentlemen might do me a couple of favors, one of them would be to sort of let people know that, if they don't have an address of Chinault Street in Los Angeles, it's the wrong one. For over seven years now, I've been getting fan mail forwarded from the test pilot school and I really feel sorry for that Post Office up there. I've decided that I will not participate in any more signing of first day covers or any philatelic material. I think ten years is enough for participation in any items that might be commercialized. I'm very happy that my three children have finally made it here for, not this function, but for some of the other festivities here in Washington. And I also decided that this was the place for my first wife to come. We get along quite well now in items and matters pertaining to our three children and I think that whatever bitterness may have existed has faded, and there's forgiveness and whatever. And I feel that there needs to be a bit more of that in the world these days. And as an example

of how we get along, I chose to ask her to come along because this event really commemorates part of my life and part of her life ten years ago. Apollo 11 may have been a small step for Neil but it was a beginning of a tremendous hurdle for me. And that hurdle eventually led to the disease of alcoholism. And I'd like you to know that I am certainly a changed person now, not the same individual that participated in that flight that was rather uptight and anxious in the post-flight activities. Most of the time, I feel quite comfortable and at peace with the world and with myself. There are a few exceptions, like this morning. But I find myself able to cope with many things that used to baffle me. And when I sort of add up where I am right now, it doesn't make much sense because there are a lot of things that might be more favorable in my life today, from a professional career, domestic standpoint, but nonetheless, I do have a sense of comfort that far surpasses anything I've had before. I haven't been all that pleased with the way people have handled interviews that I've decided to grant a few people in hopes that some of my trials and tribulations, and where I am today, and what I think about, could be expressed properly. In particular, there was an interview I participated in, that I felt did the story very well, but editorialized and put into the context whatever was felt necessary in terms of portraying us as ill-adjusted or whatever. It didn't come across too well. So I thought I

would like to take this opportunity to read what was written beforehand and I hope it won't stretch us out or eliminate too much time for questions. That'll make these guys very unhappy, I know. Of most importance to Edwin E. 'Buzz' Aldrin today are people, coming to know them, including himself. The toughest challenge of his life came after Apollo 11 in establishing a pattern outside the rigid discipline of West Point, the U.S. Air Force, M.I.T., then being a N.A.S.A. astronaut, all of which constituted the majority of his life until the age of 39. Following his return to earth, which is the title of his autobiography, published in 1973, a year and a half of public speeches and appearances as one of the first men on the moon, Aldrin found that wearing and shedding the skin of heroism is no easy task. He tells in his book of a forty day leave after graduating from West Point at the age of twenty-one, when he took a trip to Europe and came face to face with the world. For someone who had always lived in groups and who had marched to definite orders, the sensation of casually wandering around Europe was strange indeed. And so did he find life after Apollo. In seeking a new road, he fell into a state of depression and eventually underwent treatment in an Air Force Hospital in Texas. Disguised in the depression was the creeping disease of alcoholism, which surfaced three and a half years later and was a struggle he describes as the most overriding event in his life. The space program was kinder-

garten in comparison to coping with the culminating effects of alcoholism. You get into a pattern of just gradually spiralling down. As he speaks in an authoritative voice about the scientific technicalities of the space program, in a serious tone of admiration, he hails the advancement in the treatment of alcoholism in recent years. Colonel Aldrin was one of the most prominent citizens who gathered in Washington, D.C. in 1976 to announce themselves as recovering alcoholics to the National Council on Alcoholism. The acclaimed meeting was a steppingstone toward eliminating a long time stigma, and since then, many public figures have publicly acknowledged their need for help. Today, at age forty-nine, upward is again Buzz Aldrin's direction. He's treading with a much broader outlook toward helping all those who may have encountered problems similar to his. For example, he plans to act as a consultant to major corporations with advisory programs for pilots and executive personnel who may suffer from the disease of alcoholism. And he's not severed the cord with N.A.S.A. entirely. A year ago, with a TRW group, he studied the projected training of crews for United States Air Force Space Shuttle missions. And more recently worked with a group from the Jet Propulsion Lab in Pasadena on the early stages of an unmanned Mars sample return mission. Today, he is the key in the preparation of a summer program at Griffith

Park Planetarium, Los Angeles, which recounts the lunar mission. Dr. Aldrin cheers the current Jupiter explorations and considers the prospect of solar energy as an economically competitive source in the future. But he observes, referring to national business and political affairs, a lack of unity in the American people, which awoke ten years ago at the hand of Apollo 11. People are too much in dissension about what is right and wrong. It would be nice if we could harness together meaningful effort that would unify thought and feeling. What seems to unify people today is what's wrong with what's going on, instead of taking a positive action. Among those people, Buzz Aldrin is getting to know better, are his children, of whom he speaks with great pride. Michael is twenty-three, working for Western Airlines and attending college in Hawaii. Janice, twenty-two, is an opera major at California University. And Andy, twenty-one, is studying pre-law, while employed by a company that customizes vans. Edwin E. Aldrin has made the switch from being a public figure to being a private man and has balanced his library. I now have the potential to be a far more satisfied individual and appreciate the little things in life. Now I wish you could have read something like that in the magazines instead of some of the things you have read. Thank you.

MR. COLLINS: This occasion reminds me of the story about the journalist, who was doing a profile on Cary Grant.

And when he got all through writing it, he discovered he didn't know how old Cary Grant was. His age wasn't listed anywhere and he checked around and found that that was true, that no one really knew how old Cary Grant was. So he took a frontal attack approach and fired off a telegram to Cary Grant's press agent, saying how old Cary Grant? And right away, he got the answer back, old Cary Grant fine. And that's the way I feel. Old Mike Collins is fine. I'm sorry to hear from the space doctors that I'm so hard of hearing I couldn't get into the astronaut business if I were applying today, and I need glasses to read my newspaper, but despite that, I'm very optimistic, as you will see from, if you read the remarks that I think are in your press kit. And while I didn't put a title on those, they should be called earth, love it and leave it, and I'll be around later taking orders for bumper stickers, saying that. Thank you.

MR. NEWMAN: O.K. As I recognize you, would you please state your name and your affiliation, please? Yes, sir.

MR. : (Inaudible). United States Space Education Association. I have a question for all three of you gentlemen. If you had known ten years ago, what effect the flight of Apollo 11 would have on your lives, would you have rather flown that flight or a later one?

MR. NEWMAN: Yes. The question was, looking back

now ten years, if you had it all to do over again, would you have preferred to fly on Apollo 11 or on a later flight?

MR. ARMSTRONG: Well, I guess to lead off, I'd say, at the time, I was certainly willing to accept all the risks that might be inherent in such an assignment and I certainly couldn't regret then, having, living after the flight. One of the difficult-- not the fact. I was delighted to be on the flight. It was worth a great deal to me personally and I was very privileged to be a part of that, irrespective of the consequences.

MR. ALDRIN: It's a difficult question to answer because it presupposes information that we have today and reflecting back to the past and then making a decision. I feel that everything I decided to do was rather consistent with what my life was up to that point. I had an inkling of what might come afterward in terms of putting me in positions where I wasn't all that comfortable, but at that time, the treadmill was moving and it was really impossible to get off and re-board in a sense. So that was a momentary thought, perhaps, of preferring to be on maybe a second, third, or whatever landing mission. As difficult, perhaps, life has been at times for me, I feel that I wouldn't be where I am today if it were not for coming to grips with everything that was presented to me and walking through those and making necessary changes in my life and growing as a result of that.

And if it took Apollo 11 and the aftermath to put me where I am today, then I'm very happy with that.

MR. COLLINS: I was on the crew of Apollo 8 and then got bumped off because of a medical problem. Those two flights, 8 and 11 remain my favorite flights. I'd be happy to have either one of them. Those are the two best ones, I think.

MR. NEWMAN: Jules Bergman.

MR. BERGMAN: (Inaudible)

MR. ARMSTRONG: Well, the headlines always come out, disappointed, in capital letters, and that's really not an accurate reflection of my own opinion as I've expressed it over the years. Of course, those of us who were enthusiasts, would like to see more being done, and there haven't been resources available to do all the projects that those of us who are enthusiasts, would like to see happening. But, as I stated earlier, looking back, it's been a good decade. A lot of things have been done, not so many as some of us might have liked, but certainly a lot. I do hope that, as we progress through the next decade, we'll have the public will, that the public themselves will decide that this is a good investment in humanity's future and that we will take some new, big, initiatives. And, as I said before, I think that the first one might very well be a permanent orbiting station.

MR. NEWMAN: Anybody else?

MR. ALDRIN: I feel like you fell into a trap, Jules.

I've always wondered why it is that, because we're crew members of a particular mission that we all of the sudden become experts in trying to figure out what the future ought to be and make judgments that then maybe get interpreted as what we really ought to do -- and I'm speaking just for myself right now. But I ran across something the other day that I thought made the point that I'm trying to make, that I feel a little uncomfortable in trying to take the role of judging where we are and what we're doing. This is a little article that was printed in the Test Pilot's Quarterly, taken from the Illustrated World, May, 1914, entitled 'Folly to Cross Atlantic in Air,' written by Orville Wright, aviator. And I'll read it rather quickly, parts of it. 'It's a fair possibility that a one-man machine without a float and favored by a wind of, say, fifteen miles an hour, might succeed in setting across the Atlantic. But such an attempt would be the heighth of folly. When one comes to increase the size of the craft, the possibility rapidly fades away. This is because of the difficulties of carrying sufficient fuel.' And he goes on to say that, on the basis of his calculations, fifty-three per cent would have to be fuel. I checked with a 747 captain the other day, and if unloaded everyone, and just went max range, it was sixty per cent. Of course, there's been some technological improvements that, I think, Orville was unable to anticipate. But anyway, it will be readily seen, therefore,

why the Atlantic flight is out of the question. Now, maybe he, maybe in those days, ten years after he flew, we should have looked to some other people as to what the future was, maybe Billy Mitchell or Charles Lindberg. I feel uncomfortable in trying to be put in a position of saying where we ought to really go, because that's not my business today.

MR. ROGERS: (Inaudible) Rogers. If Buzz Aldrin and Neil Armstrong and Collins would have to do the flight all over again, would you like to go up again?

MR. ARMSTRONG: In a minute.

MR. ALDRIN: I think it would take more than a minute to get ready, though. So I'm not sure I would.

MR. NEWMAN: The question was, would you advise the youth of today to become an astronaut?

MR. ARMSTRONG: Well, as an educator, that is my business. I do advise youth, and they seek that question often, ask that question often, seek answers to that question. Although they probably state it a little bit more lucidly, in that they ask, should they go into the space technology field, without identifying a particular job, although some are attracted to the idea of being crew, of course. And I always advise them to do that which they are most interested in and think they're best qualified to handle. I point out to them that, for those who are interested in crew assignments, that flying is the very smallest part. It's only a few per

cent of your efforts go in flying as a crewman. Most of your effort goes into planning, strategy, testing and the same kind of hammer and tongs engineering work that most of the other people, who work for N.A.S.A. and industry in space arenas, are tackling, and that's the kind of thing they need to prepare to do because it will be the area of endeavor irrespective of whether they're in a crew capacity or in some of the many other interesting areas of space technology.

MR. COLLINS: Yeah, I'd just like to add -- I think an astronaut's job on the ground is much more interesting than most people realize. You think about astronauts in flight but the work that they do on the ground as quasi-engineers, quasi-test pilots, fascinating stuff. Talk to someone like John Young, who's I think going on seventeen years as being an astronaut. He has as fresh a point of view today as he did when he started. I think it's fascinating, John.

MR. ALDRIN: No, I guess what I was referring to was that, during the hectic days before a flight, especially a very important flight like Apollo 11, you just have to stay extraordinarily alert mentally. There's so many important bits and pieces of information being funnelled into your ears, you really have to pay attention. You have to be super-alert, sensitive. I don't think you can keep that. I don't think you can keep that pace. I just meant for a short period of time. It seemed to me that I was more receptive to and could

remember things better than I normally could.

MR. ARMSTRONG: I agree with that.

MR. COLLINS: I think that the shuttle will create a tremendous interest as we, over the next ten years, get a lot of hardware into the sky and have frequent sojourns on a more-or-less regular basis. Whether that will be met with the same degree of enthusiasm as previous space projects, I'm not sure, but I would hope not. I would hope that our use of space reaches a degree of maturity where it's accepted not as spectacular ventures in which everybody is interested but rather a kind of day-to-day, common occurrence that everybody expects and admires. I'll be happy with that. With respect to L-5, I would think that a permanent earth orbiting station by Two Thousand would probably have a greater number of benefits than an L-5 position, although that needs to be studied.

MR. NEWMAN: Yeah, the question was to do with one small step for a man or mankind, and the second -- there were two questions there, as I recall. And was there any particular point in time when you felt maximum peril. Is that correct?

MR. ARMSTRONG: Well, that sounds like a, ten years ago, similar questions. In listening to the tapes, I don't hear the missing a -- I thought I said it, but you can, since that was -- it's technically possible that it was there and not picked up by the box or (inaudible). But if you listen

to me talk here, you'll notice that I'm not really articulate, and I drop syllables. And so it would not be surprising to me if the syllable was dropped. It was intended and, if you like to put it in parenthesis, that's perfectly all right. Insofar as the greatest degree of peril, I assume now you're talking about during flight. We -- it's a difficult thing to say because I think if you look historically at where problems occurred in flight, they frequently occur at places where you least expect them and seldom at the point which you designate as the points of maximum exposure. Certainly in that latter case, we -- I always felt that the lunar descent was the one in which the greatest number of unknowns were present and the greatest -- the systems were working at maximum capacity and we had probably the least training to handle unforseen circumstances. So, going in, we regarded that as an area in which we wanted to train as hard as we possibly could. Well, I had very great difficulty getting these guys to come to Cincinnatti. I don't understand that, and they're always welcome.

MR. ALDRIN : I can't understand why you don't want to come to Los Angeles or maybe Las Vegas. I really do think it would be nice if we could get some kind of an annual gathering, not just of us, but of all the astronauts. Unfortunately, many times, if we begin to do that, we end up being kind of harassed to the point where we're sorry we ever thought of the idea. But I think from a reminiscing standpoint,

gatherings like the Dolittle raiders are something that we ought to try and establish in some fashion. I'd really like to see that come about.

MR. COLLINS: Everybody knows that people in Washington don't know what's going on, so I'm very reluctant to invite the two of them here.

MR. NEWMAN: The question was, not addressed to Buzz, but to Neil and Mike, have they had any problem since the flight of any nature, and what about on the satisfaction side.

MR. ARMSTRONG: No, not really. I think I've been blessed with good circumstances and a university that's been very hospitable and allowed me to operate just like every other faculty member there, and I've enjoyed that very much. I probably wish there was some way to cut down on some of the incoming mail and incoming phone calls, but other than that, I'm very satisfied.

MR. ALDRIN : I'd like to say that my disease may affect a lot of people surrounding the individual but it's not contagious.

MR. COLLINS : The only thing I would say is, I think there is a little tinge of sadness to the fact that, at age thirty-eight, I had what will probably be the most fascinating job I'll ever have in my life. But, you know, that's tough. That's just the way it was and is, and that doesn't

bother me.

MR. ARMSTRONG: Well, Bill, I think you've got me confused. I'm an engineering professor, not a history professor and I'm not -- I know others have been active in evaluating and correcting and challenging statements made by various Presidents but that's not the business that I've been in and I don't think I'll start now.

MR. COLLINS: Well, I thought the rhetoric was a little overblown then and now. I suppose the most historic phone call is probably the first one ever made, I would guess. In terms of the enormity of that week, I think when the history books are written a hundred years from now, it may very well be that Apollo 8 was a more meaningful flight than Apollo 11. I'm just not able to say.

MR. ARMSTRONG: I guess I'd like to say one more time, I've made this point before, but for me personally, the moment of triumph was the landing. We thought that was the real challenge. That was the difficult thing to do. Aviators conventionally like to make a smooth touch-down on the runway, a good landing. And you never think too much about climbing down the ladder. And I think, to me, it was a matter of triumph for the program and triumph for the three of us personally when we reached the surface, and I think if there was an emotional high point, it was the point at which, after touch-down, Buzz and I shook hands without saying a word, but

know that that, you know, we'd made it. That's still in my mind. It is the high point and that's -- I guess I'll never change.

MR. ALDRIN: Well, in my case, it comes back every day. And not because I necessarily choose to do that, but because it's impossible for me to avoid because of the conversation with other people where the subject is brought up, or the mail will re-introduce the subject. And so, this day, it's a special occasion because it marks the anniversary of reaching the overall goal, but in another respect, it's like every other day because I'm reminded of it every day.

MR. COLLINS: I'm a bureaucrat these days. I'm afraid it gets washed away in a sea of meetings and memos in my life. And I don't think about it nearly as often as Neil does.

MR. ALDRIN : I guess it's in the subconscious most all of the time like any experience a person goes through that is one that has made a meaningful impact on your life. Little things that may come up during the day may cause you to say, yeah, hey, I was one of those guys that went up there. But then there are a lot of other things that kind of put you in, taking one step at a time, in your daily activities, but I think it's pretty hard to remove anything like that and say it's not involved in daily activities. It's just a part of you , of what you are and what you've been involved in in the

past, makes up what you are today. And as I think you address each moment of the day, many times the fact that you're an astronaut has absolutely nothing to do with it, but when you meet some people, you know darn well that they know you are, and it depends on your relationship with those people as to whether that really makes any difference at all. And I find that, in many ways, we have a very unique position in terms of image, celebrity status or whatever. We certainly have a place in history, but I can also run on down to the corner drug store, and nobody knows who I am. I celebrated the tenth anniversary of liftoff by driving along a freeway in Los Angeles, and I was in a hurry to get where I was going. And there was a red light flashing in the rear view mirror. And that chap wasn't particularly impressed, whether he didn't hear my name when I mentioned it to him, or what I was doing ten years ago. I still got a ticket.

MR. NEWMAN: On that note, we will close. If you will sort of hold your positions, we'd like to take the crew over to the Hall of Firsts in front of the command module. Any of you that would like a few pictures over there, no more interviews, a few pictures, we will grant that. So, thank you very much.