Mr. Bill Harwood

Oral History

Kennedy Space Center

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Moore: Today is Friday, June 14th 2002, I'm Patrick Moore, Oral History Program Director, University of West Florida and visiting faculty fellow for Kennedy Space Center and I'm here today with Bill Harwood who spent many years, has been here since 1984 at Kennedy Space Center and I'm gonna talk a little bit about his experience as a reporter in various capacities. How are you today?

Harwood: I'm good. How are you?

Moore: Doing great. If you could tell me a little bit about your background before you came here, what was it that got you into reporting and led you to Kennedy Space Center?

Harwood: Well, I'm from Nashville, Tennessee and I was blessed with parents who encouraged curiosity and I had a brother who is a science fiction fan and I started reading science fiction at an early age thinking about space flight and my brother went on to be a geophysicist so there was science in the background in my family. And when I went to school I never could find any one thing I liked to major in, I majored in many, many things. I majored in physics at one point and dropped out. I have upper _____(division work) in math and geology. And when I finally went back to school in 1980 I decided what better thing than science journalism since I couldn't be happy doing one thing I would do a little bit of everything. So I went back to the University of Tennessee and earned a degree in journalism. I was hired by United Press International out of college in Columbia, South Carolina where I was a general assignment reporter. I came down to Kennedy Space Center back in college with my school newspaper with the University of Tennessee for the 2nd and the 4th Shuttle flights on my own. And then with UPI I went down to two flights again on my own just to see how UPI handled it. And as luck would have it they were getting ready to reopen their Cape

Canaveral Bureau down here in 1984 and I just happened to be at the right place at the right time. And I'd followed the Shuttle program growing up earlier in my life and so I came down here in February of '84, covered my first mission for UPI which was STS 41B, the 10th Shuttle flight. And then in April of '84 we reopened the Bureau formally and I moved here and I've been here ever since.

Moore: Was it the work. . . you said you came down on your own, i.e. they didn't pay for you, you just did it kind of. . .

Harwood: Yeah.

Moore: Was this an assignment you took? Did you just say I'd really like to go down and see a launch?

Harwood: No. No. It's neat to watch a big rocket take off, I had never done that before and when I went down with my school newspaper and that was my idea, I thought it would be fun to see the Shuttle take off. I'd been interested in that and had followed its developed over the years in and out of school. I just thought it would be fun to see and once you've seen one of these there are people like me who get addicted to it. It's a fantastic thing to see and it just looked like a lot of fun and I'm a science writer, I'm an amateur astronomer, all the things they do in space are things I'm already interested in so it was just a natural fit for me.

Moore: Was it easy to get credentials to come down here from the newspaper? Did they treat you like any other press?

Harwood: Absolutely, even, even, I'll give NASA credit, they have a program where kids, students for college papers, they make it available for college and that's how I came down. My supervisor wrote a letter and they sent us credentials and that's how I got in and other than that it's like covering any other event, the credentialing process is pretty similar to anything you do.

Moore: Had you been down to a launch prior to this in any other capacity or was this your first visit to the Cape?

Harwood: STS-2 for the college newspaper? I had been here on vacation in high school and younger and took the bus tour, I'd never seen a rocket launch, no.

Moore: So you did take the bus tour earlier and kind of fed your interest in this.

Harwood: Yeah, back when I was a kid, yeah.

Moore: I hate to go back, but tell me a little bit about that experience. What did you, what did you gain, what did sense from NASA when you came down?

Harwood: Doesn't really apply to me. I was on vacation with some other kind of college-age kids. We were just traveling around Florida, spring break kind of stuff, and I thought it'd be fun to come over, this is back when they were still launching Apollo stuff back in I think this was probably 1970, somewhere in that timeframe. And I just came down and took the bus tour which was a lot of fun.

They took us inside the VAB, which they don't do anymore obviously with the Shuttle because of the solid booster segments, they don't let the tourists go in there anymore. But in the old days they'd take you in there and let the public see all the stuff in the VAB which is pretty neat. I can remember some of the stat's from the tour guide to this day. I think of how amazing that building was, how big it was and all of that. But it was just a vacation visit.

Moore: Well, and part of that, were you the only person in your group that wanted to come down?

Harwood: Uh, well we were already here. I just said let's take a detour to see the Space Center, and we did so it was just. . . and we all had a good time doing that.

Moore: Amenable to that, did they have a visitor complex, this was back when TWA was . . .

Harwood: Yeah, um, you got me because I don't remember and they must have, we got on the bus somewhere but I don't remember that part, I remember the tour.

Moore: It was the bus tour then that had the most impact. Coming down for those first launches tell me a little bit about that experience. What were you expecting and what came out of it?

Harwood: Well it was kind of the first launch was STS-2 in November of '81. I was working for the University of Tennessee Daily Beacon newspaper, thirteenth largest paper in Tennessee mind you, but me and a photographer on the staff packed up a Volkswagon Beetle with all of his camera gear

and we made one of these mad dashes down here like the day before launch 'cause neither one of us could afford to come down and stay here for any length of time so we drove down the day before. And it was very exciting for a college student you know because here's all of these nationally known space reporters and science writers because for the second Shuttle flight, like the first I imagine, there were many, many reporters here much more than come to these latter flights. It was just packed; it was a real beehive of activity, big energy level, and for a college kid that was really something. And of course there's the Shuttle out there you know it's three miles away, that was very impressive to me. And the launch as it turned out they didn't launch the first time I was there, they got down five minutes. I think they had some contamination in the hydraulic fluid I believe when they started the auxiliary power units, if memory serves, and they scrubbed I think to flush the hydraulic system, which took a few days and so we drove back to Tennessee and then we turned around and came back because I was determined to see this launch. And I remember I brought, I'm an amateur astronomer, I have an eight inch telescope, and eight inch Schmitt-Cassegrain telescope and I had some camera gear and I remember setting all of that up at the press site and through the telescope of course you were really zoomed into the pad. I think it was about a two-thousand millimeter lens, when you use it it's a telephoto lens. And I had an air release, trigger release for the cameras that I could put under my foot so I didn't have, I had a camera mount on the telescope that I could just push my foot down and the motor drive would fire this and I could look through the telescope. And I remember when it took off it was really a strange experience, there was a lot excitement because it was taking off but it's three miles away so it takes a while for the sound to get here. And I remember when it cleared the tower the sound still hadn't gotten here when you see that amazingly bright flame from boosters, that five-thousand degree flame that was so bright through the telescope it was almost hard to look at it was so bright and I remember thinking this is just incredible and then the sound got

here. The ground starts shaking, and you have to remember you know this is as I speak today we've had a hundred and ten launches but at that point we'd only had one and so the whole process of the Shuttle taking off was still an unusual event, and I can remember the sound being so loud, I don't think I've ever, I don't think I've ever seen a launch like the first one I saw. Maybe it was just because you're so unsensitized to it I guess that all of those experiences are coming in and you're brain really has a hard time coping with it. And I remember yelling out some pretty good profanities because you couldn't hear it; you couldn't hear anything I was yelling in this crowded press site because it was so exciting. And I shot a bunch of film and I remember it went up over the hill and disappeared and I was just blown away, I was just, I just, it was just amazing to me that you could do something like that and the people could still be alive after it was over, that were riding this thing. It was really an amazing thing and I was hooked. I mean I was hooked.

Moore: What did you say in that first article?

Harwood: It was very straightforward, college newspaper story. You know it had an inverted pyramid lead and it was just the Shuttle took off and it was just a standard story. I mean it was nothing. . . I think I still have it somewhere, but it wasn't any big deal. And of course this was a manual typewriter, you have to dictate it to Knoxville literally word by word over the phone and there's no way to file electrically or even fax it 'cause we didn't have any equipment. And the deadline for a college paper was way in the afternoon which meant you couldn't write anything about what happened later in the day. So it was, you know, it was a newspaper story, there wasn't much to it. It was the experience that was the important thing.

Moore: That's my question. There wasn't any way of conveying what you experienced other than . . .

Harwood: Well I tried.

Moore: . . . it happened and was successful.

Harwood: I tried. You know, I mean I talked about the crackling roar and all the adjectives that you could put on something like that I mean sure that's what a writer does. But I don't think anybody has ever captured a Shuttle launch in words and I don't think in film either, it's one of those things you have to see with your own eye and you have to feel it. And you can't do that you just, with writing or even in video you just come close but you can't really get it.

Moore: How did your editor respond? Did they like the paper or was there any discussion about it?

Harwood: No discussion at all. No, no, for something like that I mean you know if you go to the trouble to drive six-hundred miles to cover something it really didn't matter much what you said they were gonna print it. No, it was fine. It was light editing.

Moore: And then you came back and did STS-4.

Harwood: Came back and did the same thing except at that point I was the editor of the paper for the second flight so I could pretty much do what I wanted to. . .

Moore: Did you pay yourself to go down, did you. . .

Harwood: No, there's no money of course, but I could assure that it was on page one above the fold, that was my call. And so I did that. It was the same kind of deal. I just came down and covered a launch and left.

Moore: Anything different that you put in that one?

Harwood: No. It was, no, same kind of thing. I just, you know a little more the second time around. You're not completely just walking around with your mouth open and you're more confident about what you're doing. But it was still an unusual experience I mean it was, it was something to see.

Moore: The reason I ask is it seems in many respects that what happens here the press is in some ways the translator, the mouthpiece of the events that take place. And how was it at that point, did you, what was it that you were trying to say about this process?

Harwood: Well I think in the case of the first two flights when I worked for the college paper it really wasn't, I wasn't thinking of myself as some kind of gatekeeper between the story and the people and I'm telling them about this, I didn't look at it. . . it was more of a personal experience, I mean it's kind

of a, it was almost, it was almost using the paper as an excuse to come down to see Shuttle launches to be honest with you. I mean I tried to write a good story but I didn't view myself as, you know, with the kind of deadlines that are way in advance of the next day, there was really nothing I could write that was gonna be timely by the time it got printed anyway. That's just the nature of that beast. But I viewed that as getting a foot in the door and getting your feet wet and something that I had a strong attraction to anyway and I did and it did.

Moore: Was this what paid off, was it this activity, the fact that you had come down here and covered these two launches, you were the editor of your school paper that got you in the door with UPI?

Harwood: Um, no I don't think that helped me get hired by UPI. I was a pretty good writer I think is why I got hired by UPI. But when I did come down for UPI two times, again at my own expense on a vacation kind of thing not working, just used UPI to get press credentials because they had a trailer here, a big trailer and a science editor, a photographer, bunch of people fly in for launches and as a UPI staffer I could, I wrote a letter to Al Rossiter the science editor and asked if he would get me credentials that I would just enjoy stopping by to see a launch. And he said sure so they set up credentials and I drove down and I was just in the trailer with them. That was STS-8 was the first one which was the first night launch and I will never forget that one, that's a big thunderstorm, that was really something to see. And it kind of just turned out that because I had studied the Shuttle program and kept up with it over the years, you know, you'd be in the trailer with these reporters, some of whom don't cover it full time and there would be questions and it just turned out that I tended to know the answers to a lot of those questions. So it kind of. . . you know, they were kind of like who is this

guy kind of thing you know. And then it wasn't long after that they decided to reopen a bureau down here and I think it was because of the two missions where I'd come down on my own and expressed a clear interest and expressed some knowledge of this and the fact that I could do some writing I was the logical choice when they opened the bureau to make me the bureau manager which is what they did.

Moore: Was there a correlation between the fact they had a knowledgeable individual that was here and they came to you and said would you be interested in doing this or we're going to open this back up, anybody interested in coming down here.

Harwood: Uh, no, I think the fact that I came down and got to know these guys here outside and demonstrated a clear knowledge of the program is what did it.

Moore: So you were the catalyst in reopening the . . .

Harwood: No, they were going to open the bureau anyway but I think I came along before they had ever gotten to the point of advertising this as some kind of open job and I was just there you know at the time, at the same time they were talking about doing it. It was just the logical thing to do. I was free to move. I mean I didn't have any strings holding me in South Carolina so it all just worked out.

Moore: And so you were excited about this move I take it.

Harwood: Extremely. Extremely.

(Laughter)

Moore: Tell me about coming down here and setting up opening this operation, it was just you by yourself.

Harwood: Yeah, the bureau, just one person, the AP, the Associated Press and UPI reopened their full-time bureaus about the same time. I think it was in, I think we both started on May the 1st of 1984. Howard Benedict came down from AP, from Washington and I came down for UPI. Now back in the '70's through Skylab both wire services had bureaus here fulltime. Al Rossiter and Howard Benedict both lived and worked here. But between Skylab and the start of the Shuttle, that six or seven year period there when there weren't very many launches they shut down, both of them did. They both went back to Washington. Al became the science editor of UPI and stayed in Washington and Howard always wanted to come back here I think and did when they reopened their bureau. So Howard came back down on May the 1st and Al had hired me to be his counterpart down here and we both reopened our bureaus side by side trailers on May the 1st of '84 which was right after mission 41C the 11th flight and right before 41D the June 1st flight of the Shuttle Discovery.

Moore: Where were these physical trailers located?

Harwood: Literally just two buildings over. The AP trailer is still there. . .

Moore: It's still there, the same trailer?

Harwood: . . . Yeah. They have a new trailer; it's a double-decker trailer. UPI's trailer is gone now. It used to it was a sixty foot trailer. They have a small trailer here but UPI isn't, doesn't have the presence here they used to.

Moore: So tell me about that process. What transitioned you between UPI and starting to work for CBS years later?

Harwood: Well that's a long story. Well it started with two things, with UPI's ups and downs because they had a bunch of ups and downs and with Challenger. In the wake of Challenger there was, I think I remember counting up one time, I think I worked something like ninety-two days in a row without a day off after Challenger. I think I didn't take a day off until they flew the crew remains out of here, that following, I can't remember the date now I think it was early May. But during that three months I worked a lot with Bruce Hall, he was a CBS reporter who would come down here for launches and there'd be a lot of weekends when he and I would be the only people out here.

Moore: This was before Challenger?

Harwood: No after. This is in the aftermath of Challenger. There would be weekends when, I mean I was here every single day. . .

Moore: So when, when, I want to talk more about Challenger. When did you start with CBS? Was this kind of the intermediate. . .

Harwood: Well I'm giving you. . . I'm getting there.

Moore: You were still with UPI.

Harwood: Yeah, I was still with UPI, absolutely.

Moore: Still the bureau chief.

Harwood: But in the aftermath of that Bruce Hall was a very dedicated television reporter who really tracked this stuff. And so was I and there would be a lot of times when we'd be the only people out here and we started sharing information because NASA didn't release a lot of information. We started working together and that's how I got to know people at CBS. And then in the early '90's in '90-'91 timeframe UPI had really run into some financial problems. They declared bankruptcy. They had cut pay. Gone through a couple of different owners and it just didn't seem to me, they were losing clients, and it didn't seem to me there was any long-term future there. And so I started looking around and at that same period, again just being here the timing of it, CBS was interested in having somebody onsite who could follow the Shuttle program for them so that they didn't have to always fly down producers, correspondents and crews to cover these things without any continuity of knowledge, you know, because they send whoever is available kind of a thing. So I started working for them as a freelancer on the side while I was still working with UPI. And then slowly the CBS work

ramped up, the UPI work ramped down until in '92 CBS offered me a contract and I started working for them fulltime.

Moore: Okay. Transition. Let's go back then to pre-Challenger, tell me about the relationship you had with the institution as well as the other press people.

Harwood: Well it was really interesting. The, it was a much different press operation back then, there was a certain, I don't know, you know I look at the entire Space Program as pre-Challenger and post-Challenger because it really was a dividing line in terms of not only the Shuttle program, its goals and what was going on, but in terms of the way the media and NASA interacted, there's a very clear line in the sand that's pre-Challenger and then post-Challenger. Pre-Challenger things were much more open. There were two things going on. There was a lot more interest in day-to-day activity back then than there is today because it was still relatively new. Challenger was just the 25th flight. In '84 I started with the 10th flight so this was still a fairly new procedure. So I remember every morning when I would come to work and I would go over to the public affairs office and sit down with the Shuttle public affairs person and talk about what happened overnight literally, you know, what systems got tested, what got screwed up, what went well. I mean we really covered it at that level of detail.

Moore: And they shared with you?

Harwood: Oh, of course. And they would today if you went in and asked them. The interest level has dropped off in the day-to-day bolt turning aspect of the Shuttle that reporters don't do that

anymore, but at that time it was a daily kind of a thing to really, really keep track of it. They were very, they would bend over backwards to make things happen for the reporters, tours, access, you know if you needed to go out to the pad to shoot something it was no problem. You could arrange it with a phone call and get out to the pad. They had a bigger staff than they do now and that was a big factor. . .

Moore: They had a bigger . . .

Harwood: The public affairs people had a bigger staff to be able to honor the kind of requests that reporters would make. And again because there was more interest there were more reporters down here. You had to have more people to deal with it. To talk about how the press inter-reacts you have to look at it over time and you have to see that the level, the number of personnel public affairs has at their disposal is a steady drop off as the program gets older and the number of reporters coming that's related was a steady drop off. You know like I said in the journalism world you have this old saying that if a man bites a dog that's a story and if the dog bites the man that's not a story. And that's kind of the case here as you keep launching successfully it's less and less of a big front page story the fact that you launched it. It's still an amazing process but it doesn't have the news value that it did the first time or the second or the third time. And so the number of reporters that would come down for launches declined. The number of NASA people that were here to help the reporters declined and so the relationship changed.

Moore: Now you witnessed this decline between 10 when you first here in that capacity. . .

Harwood: Well and even going back to 2. I mean 2 of course was hundreds of reporters I mean just an amazing thing. And there was more than hundreds I should say. When Challenger took off as I recall there were more than four-hundred reporters, photographers, hangers-on, people that had been accredited through the news operation to come cover the flight even though the number actually covering it was much smaller, but that number was about four-hundred. Today you'd probably find a hundred maybe. STS-2 there were many hundreds. So I mean it's kind of a steady drop off. So pre-Challenger it was a lot of fun. We certainly knew there was risk there's no question about that. I used to write personality profiles on each astronaut before launch just, not because anybody would ever print these things but because the client would have what could be an instant obit in their computer if the Shuttle blew up. We did that from day one. And you know you just past tense it and it turns into an obit. And so we were very aware that something could go wrong with this thing. We were not fooled in that regard. I had no clue that there was any issue with the solid boosters. I've heard reporters say if we had just paid more attention you know that somehow people could have found out about this. I don't believe that for a minute. In any program as complicated as this there's always something under investigation and you can find a memo from somebody somewhere that questions some bolt or something and then if that's the one that's failed you could go back and say we should have been watching this. But to me that's an absurd argument and no reporter I know of had ever heard of a booster o-ring or any problem with a booster o-ring. So I knew there was risks, weren't aware of the specific risk that they had been flying with and all the close calls they had had of course until well after Challenger. So it was kind of a fun time, there was, and when I look back on it it's almost like an innocence that was there. The reporters pretty much would accept NASA's word for stuff. I mean there was talk about the costs and the fact that you'd have launch delays. Those were two things that got written about a lot. The delayed plagued Shuttle. How much it cost. I mean

those were. But in general the press coverage I think was amazingly positive, almost unquestioning I would say. You know we talk about the science and what they were doing and it was an extremely positive. After Challenger that all changed because of the way in my view NASA managed the aftermath of the disaster from a public affairs and how they wanted the public to find out about this stuff. The way they did that had, I think, lasting effects that have never gone away. I think they squandered twenty years of really amazingly good relations with the media. They really blew that off in the aftermath of Challenger. I don't think it was intentional but that was the effect of it.

Moore: Now I want to go back, you were saying there was this question about you as a reporter that maybe perhaps reporters we should have done it, we should have been more aware. These daily briefings that you were going to, obviously you were attending this. How many other reporters were involved in this everyday being aware of what worked . . .

Harwood: Uh, well, the two wire guys. I mean the two wire guys would keep up with what's going on. But it wasn't . . .

Moore: The two of you really.

Harwood: . . . yeah, it wasn't a – and the Florida Today newspaper would keep up with this kind of stuff and the Orlando paper, the local guys. No, this was local – what happened to the Orbiter. The o-ring problems were things that were being worked out of Marshall Space Flight Center. And while I would contact Marshall about engines or this, that, or the other for feature stories it wasn't where I was based and I certainly was not privy to any long-term internal briefings about booster safety which

had been going on all the time at Marshall it's just we didn't find out about that until after the fact. But I remember after Challenger I made that comment because I've read some reporters talking about if we'd done our jobs better, if we weren't so blind, you know, in just accepting and being hand-fed by NASA all this stuff maybe the reporters could have gotten wind of something and publicized it and that would have caused something to happen. And I just, I don't believe that for a minute. I think that's hindsight from people that don't know any better.

Moore: Tell me a little bit about the experience itself. You're there for the Challenger. I've read the work that you put, that you did on it and it's . . .

Harwood: What? That web stuff?

Moore: Yeah.

Harwood: Yeah. Well let me say one thing first. I mean when we were still talking about pre-Challenger, there was a, I think there was a spirit at NASA that the reporters kind of latched on to – we can do anything. There really was. Some of the missions they did before Challenger specifically mission 51A in November of '84. They did 51I in August of '85 I think it was. 51A is where they went up and got two satellites that the motors hadn't worked on and they were stranded in useless orbits. And they went up there, Pinky Nelson, uh not Pinky Nelson, Joe Allen and Dale Gardener went out with jet backpacks and grabbed the satellites and brought 'em, I mean this was just amazing stuff. They would never do a mission like this today I don't think. It was like they had a level of willingness to accept risks I think that doesn't exist today in the aftermath of Challenger. And people could argue

that with me. But they did some missions that were so bold and daring before Challenger that I can't imagine them doing after Challenger. It's just an observation I'm making about just the whole mindset of flight controllers and astronauts and what they thought they could do. I mean I really don't think they felt there were any limitations on them. I felt they, they had such a level of confidence that we can really do this stuff you know. And some of that got lost after Challenger. That's the point I was making.

Moore: Do you think that's an institutional thing or is it the fact that astronauts. . .

Harwood: It's just human nature. It's human nature. I think the Challenger was such a devastating thing that I think a lot of people were disillusioned and it was just. . . Challenger is a whole different issue. I'm just saying before Challenger there was just a different sense about people than there was after, there was more of a we can do anything than there was after.

Moore: Not necessarily we can't do that because there's a risk but rather I as an individual astronaut or I as a flight controller, I'm not willing to take that risk because the possibility is . . .

Harwood: I don't know. I don't know how you want to break that down. It's just an observation on my part. The missions were more exciting then. You were less worried about failure than you are after Challenger. And that's not when I say you I mean that's everybody. And I think that percolates through the agency to some degree and I think it effects the way flight controllers think, astronauts, reporters and everybody else, it's just before Challenger you're aware that it's dangerous. After Challenger you have the image of the thing blowing up and then you have the aftermath in knowing

that really was a preventable accident and people knew about this. It really took that level of confidence that existed before Challenger and really brought it down. That was the only observation I was making. Challenger – gee I don't even know where to begin on that one. Well it was interesting from a personal standpoint because Challenger happened about two days after Voyager II went by Uranus. And all the big shot space reporters were out in Pasadena because the day Challenger took off there was a news conference scheduled to sum up everything Voyager had found out about Uranus, it was a big deal. Matter of fact if Christa McAullife hadn't been on Challenger I doubt that mission would have gotten near the coverage it did because of the Uranus thing. The Voyager deal was a much bigger deal from a space writing and reporting standpoint than Challenger was.

Moore: You mean from your stance? Were you. . .

Harwood: Oh no, I was here but Al Rossiter, the science editor, who was always here for launches was in Pasadena. This was the first launch that I'd ever been at that Al wasn't there. Al was the real mainstay at UPI, had covered everything from the first Gemini on and really knew what he was doing and just having him there that day would have been a great thing but he wasn't there so it's just a personal thing that affected some of the coverage that I provided that day because I was still pretty new at this. And I've told people that, and it's a true statement, it takes two years to have any idea what this program's about if you walk in off the street and I walked in thinking I knew some stuff. It takes time to learn the intricacies of a program that's as technically complex as the Space Shuttle. So I knew stuff but I had never covered a disaster before. I'd never covered anything of that magnitude before and it's a crazy thing. So anyway Christa McAullife, of course there was a lot

attention that day because she was onboard the flight. We had all interviewed her, you know the whole deal. Yeah that's stuff I had in my trailer that day they took off. That's their flight plan, my car pass for coming out here that day, all that stuff. Um, I didn't think much about it. I thought she was, matter of fact when they had the teacher in space competition I picked Barbara Morgan, her backup, to win and I picked Christa to be second. It's really interesting but I picked those two and they're the two that won. She was a remarkable woman and you know a very capable person but so was the whole crew and I always felt in hindsight that the rest of the astronauts never got the remembrance or the attention or the honor they deserved because she was on that flight. It wasn't her fault. It's just that she's the one who got all of the attention and I thought that was a shame because those people were also dedicated, smart, you know the best people this country has to offer. And I came to work, we used to come to work, I would come to work when they started fueling in the old days because I just thought any time you're loading that much hydrogen into anything it's probably worth being there just in case. I used to think that somebody, it's funny, in September 11th retrospect I used to worry about planes flying into the tank thinking that you could do that real easily and if you flew into the tank in a light plane you'd, you know, take out a two-billion launch, irreplaceable launch pad and you'd destroy an Orbiter. So I'd come out for fueling. And I came out that night, Challenger was supposed to launch at I believe at 9:38 in the morning, I came out about 11:00 that night to be here for fueling and it was really, really, really cold. We had a . . .

Moore: Where did you go for fueling?

Harwood: Oh, just my trailer. We had radio scanners I could. . . The press site would be open twenty-four hours a day. Just so you know, a data point, Howard and I were the only two reporters that had a badge that let us come out twenty-four hours a day seven days a week no matter what. He and I had fulltime access. Other reporters could only come out during business hours or during a countdown you could come out twenty-four hours once the count started. But Howard and I could come out anytime we wanted. But I came out at 11:00. It was really cold that night. But we have radio scanners, to back up, where I can hear the guys out at the pad. I don't need public affairs for that. I actually follow on the loops and listen to what people are doing. And they had some problems. They started fueling. They had it delayed I think a _____ it's called a something interface, it was some kind of circuit in the MLP screwed up and they had to send a crew out to do it that delayed fueling. It finally got going. I remember how cold it was in the trailer 'cause we had these baseboard heaters and I had 'em cranked up and I was still wearing a coat you know and the whole thing just to write the story. I think it was in the twenties out at the pad. It was extraordinarily cold. Launch was at 9:32 and they delayed it for two hours because the fueling got delayed and because they wanted to do another ice inspection. They were worried about the ice on the pad, not because of what it might do to the o-rings, they were worried about ice breaking off and then hitting the Orbiter and causing some damage. Again, I had not ever read or interviewed or talked to anybody that gave me any sense that cold weather was bad for the boosters, didn't even occur to me that there was any system in the booster itself that would be affected by cold weather. Ed Delong who was a long-time UPI writer had come for that launch to take Al Rossiter's place because he was out in Pasadena for Voyager and Ed wasn't a space guy at all so I was writing the action lead which is in the wire service is you write for PM newspapers and AM cycle. The PM's are the afternoon papers and then in the afternoon you're writing a story for the AM papers the next morning. Challenger was a morning

launch, there's still newspapers on the west coast at 11:30 you know on the west coast that's, you know, 8:30 or whatever, you could still get in the afternoon paper so that's the action lead in this case and I was writing the PM lead. And the way we would do launches is I would already, I'd file a couple of leads overnight saying they'd fueled it, they had completed fueling, here's what the weather's doing, that kind of stuff. I'd always wrote the launch story in advance, about an 800 word story that was already written where you just had to fill in the time. Took eight minutes to get to orbit so as soon as the Shuttle moved the editor in Washington would push a button and file a story saying the Shuttle had taken off and was on its way to space. Eight minutes later he'd file another version that I'd written in advance that just changes the top two graphs to past tense and to say it got into space. So the minute it moves there's 800 stories on the wire and that goes, I mean 800 words on the wire that goes to radio, TV, newspaper clients, anybody who gets the service. So that morning I had written my story. I had it all polished off and we were just shooting the breeze, telling jokes, you know the usual pre-Challenger launch routine because we don't do that anymore, and I was on the phone to Bill Trutt who was an editor on the national desk and I'd already filed my story through our computer system and he had it on his screen, I had it on my screen. And what we would always do is I would call him about a minute before liftoff and we'd keep the phone line open through main engine cutoff just in case something happened and I remember watching the engines fire up and as soon as it moved I said, "Let it go." and tried to push the button and we just started shooting the breeze which is what we always did. And I had a TV mounted above my head on the wall and we have a big bay window and is turned out the geometry of the launch was that in that time of day, the Shuttle took off it went straight up and I didn't see anything wrong, you couldn't see anything wrong from our vantage point. You know with big cameras later there was black smoke around the booster but that wasn't visible to us at all. And it kind of, if you were me, the vehicle arced up and like this so that as you're

looking you're looking through the exhaust trail at the rocket ship so the rocket had disappeared behind the exhaust trail and that's common. Now on NASA television of course you could still see the rocket okay, because they've got the big TV cameras on it and all this, but I tended to watch, look out the window and I was shooting the breeze with Trutt and the only reason I'm telling you all of this is because I didn't see the Shuttle blowup. I was looking out the window. I wasn't watching the television and what I saw was the contrail, the exhaust trail from the SRB's, it kind of thickened a little bit and I could tell, I could see some little pieces it seemed like, little flecked glinting things in the sky coming out of there that I knew wasn't normal, and I was talking, and I remember looking I was going like what is that. And then all of a sudden one booster came flying out. And remember I hadn't seen that fireball. I didn't see all the contrails. I just saw this thickening and then this booster comes flying out. And I knew that was bad even though I hadn't seen what had happened. And I told Trutt – what kind of language can I use on this?

Moore: Whatever kind you like.

Harwood: I said, "I think the thing just blew the fuck up." I can remember what I said. And he said, "You're kidding?" and I said, "No. Let me dictate." And I just started dictating. I think I said something like the Space Shuttle Challenger apparently exploded, 'cause I didn't know what had happened, apparently exploded two minutes after liftoff. Fate of the crew is unknown. Trutt types that pushes a button, sends it. And I said, launch occurred at 11:38, blah, blah, blah. He pushes a button and sends that graph. And so the clients are getting this one graph at a time over their little printers you know and the bells are ringing and that's how that stuff used to be done in the old days. The two minutes was wrong. My time sense was obviously screwed up. It happened at 73 seconds

of course one minute and 13 seconds and there was no apparently about it. Now Al Rossiter who is out in Pasadena watching the thing on NASA television in the auditorium at the Jet Propulsion Lab where they're getting ready to have the Voyager news conference, he has a computer out there and calls. So he calls Trutt and says get apparently out of the lead 'cause it obviously blew up which he did. I mean we're just rolling at this point; this is real time so I'm dictating what I see. And then after about, and I can't remember how long this was, it was after a fair amount of time I hung the phone up and started typing again you know instead dictating, just recording my impressions, passing along what the guy at mission control was telling us, the commentator Steve Nesbit who we heard over NASA select, and then it's, you're just real time. The thing about the wires is you're not trying to, you're just telling what happened as fast as you can pump it out and that's what we did endlessly. I remember that day I think it was late in the afternoon when Jess Moore who was the Shuttle program director at JSC came out here to the press site, they had the first news conference because NASA had not addressed the fate of the crew at all even though it was obvious these guys were dead, and even in our stories I'd, for quite a while I left the possibility open that they weren't dead even though it was worded in such a way that it was real clear to the reader that I thought they were but we didn't know that. And Jess Moore came out there and I'll never forget it he had a trench coat on it was still cold and he just looked ashen. I'll never forget it. This is a fine man, a nice man, a guy who is a very warm man, and that day sitting out there he looked like death itself, it was just amazing. And he came out and he said he had the sad duty to inform us that the crew was dead or there's no hope for their survival. . . I don't remember the words, but that's when NASA officially told us that the astronauts hadn't survived and of course we all filed on that. It really never went to you know I think I was still here at midnight that night, twenty-four or twenty-five hours after I'd walked in the office that day. By that time Al Rossiter had gotten here from LA, flew in about 11:30 or whatever to relieve me

and to write and to carry on 'cause this was just a twenty-four hour a day operation for quite a while. It was such a shocking event. Vice President Bush came down that day, I mean it just one thing after another. And of course President Reagan's state of the union address was gonna be that night. And I believe he cancelled the state of the union address and it was a big deal, it was a blow to the whole American psyche when that thing blew up. It was – and to me personally, to the reporters, I can remember the first time I got out of that chair that day was I'm gonna guess it was three-o-clock in the afternoon, four hours or so after it blew up, I had to go to the bathroom I think, our trailers didn't have bathrooms you had to walk over to the public affairs dome, and I remember walking in the dome and Howard Benedict was walking out, the AP reporter, and I remember him, I'm getting choked thinking about it to this day, isn't that amazing? I remember he grabbed my arm and he said this is just a terrible day Bill, it's a terrible day. And it was. It was a terrible day. See I can get choked up to this day. And it just went on and on and on. It was just, it was just a terrible day. He summed it up.

Moore: The other press that were here, you talked about how there had been this declining interest and that certainly the top people were not here for the launch. You were here. What were the other press? Who were the other press that were here? Were they new people?

Harwood: No. No, when I say everybody – I mean the big time space and science writers. But there were still the regular guys from the Miami paper, Orlando, here locally, Atlanta still sent people down, the Washington Post still sent people, the New York Times was here. There were people here. And I want to say that morning I can't remember the exact number, they've got it over there, but it was under four-hundred or right at four-hundred who were here that day had been accredited. But that number in those days, half of those people weren't really covering it. You had retired people

showing up. People like me that asked UPI to let me come down for a launch. People would show up. So the number of people actually covering that launch I'm guessing was probably on the order of a hundred when you really got down to people that had real jobs for daily national news media or even local papers. That's a guess on my part. By the end of the day there were more than a thousand here and this turned into wall to wall satellite trucks. And you have to remember this was back in the days when there was only CNN was the only news network out there and satellite trucks cost a half-million and up, I mean not many stations have satellite trucks in 1986, not a lot of smaller market stations. Today every station has a satellite truck but back then that wasn't necessarily the case. But he press site was booked. I remember the phone lines got overloaded. People couldn't make calls out there was so many people here the circuitry just wasn't setup for it. And NASA didn't – I didn't expect them to tell us much the first day because they didn't know obviously. But what happened to public affairs and what then came and had an effect on all of us in the media and by extension the public is Jess Moore and Bob Crippen who was a senior astronaut in the office, Bob Obermeyer, who was another senior astronaut who came down here in the wake of Challenger, they implemented a policy of we will not address the crew at all. We will not address what may have caused this problem until our investigation is complete. That's fine in a perfect world but you cannot expect to lose one-quarter of your manned space flight capability and kill people who we have made heroes with NASA's encouragement and not tell us anything about it. And the relations between NASA and the media started going downhill at that point in a major way. And some of this was because it was so ludicrous. It was because the public affair – let me back up a second, NASA public affairs always had a contingency plan because they knew the Shuttle could blow up and they had a plan that had been signed off all the way up the hill, here's what we're gonna do if this happens. We will address the fate of the crew right away. We will do this. We will do that. We will do this. In the

wake of Challenger the NASA management utterly ignored that plan. They ignored it. NASA PAO did not have somebody in charge who really knew what was going on. Shirley Green had come onboard, this was her first launch, like in December as I recall. Jim Beggs the administrator had been indicted, you know, for work he did when he was with General Dynamics, ultimately dismissed, but he wasn't ever here for that launch. He was an acting administrator, a guy that didn't know a whole lot about the program. And in the PAO world there was nobody there to go carry the fight to NASA management to say you can't do this. This is a mistake. If you do this you're going to really screw up your relations and it's gonna hurt you down the road. There was nobody to fight that battle. And as a result, and I don't know that anybody could've won that battle anyway okay, maybe even if you had had a strong person in public affairs it might not have made a difference. The astronaut community was utterly determined not to have anything about the crew to protect the families from grief and you know all of that. They were determined. And this policy was so ludicrous that at the first news conference where they released photos from their long-range tracking cameras where you see the fire, the big jet of fire, they actually put a public affairs guy up there who was not allowed to use the word fire. He called it an anomalous plume. I mean this was so absurd that reporters were laughing at these guys, even it was just – and I felt really bad for the guy that had to get up there and do this. He was badgered and badgered and badgered and all he could do was call it an anomalous plume. It was that level of mico-management from the Shuttle guys, the Shuttle program people to the PAO world who were the folks who knew how to do this, not the Shuttle guys. I sometimes get the impression that astronauts think they're experts at everything there is and in this case they weren't. And that example is the one I always site because it was so ludicrous and everybody knew it was ludicrous but they just stubbornly stuck to this. And as the weeks went by they just didn't, wouldn't tell you anything so – literally just wouldn't tell us virtually anything about what had happened, what

they thought might have happened and they knew. I mean okay by that day they had close-range cameras that they knew something had happened to the booster joint, they knew that. Because somebody screwed up one day and on NASA TV for a second you could see the thing on the pad and there was a circle around the booster joint I mean it was some briefing that had accidentally gotten put out on the little local network. But they knew this stuff but they wouldn't tell us anything. And I think that that was a huge mistake in hindsight and I think that as a result a combination of not telling us anything and the revelations of how messed up this booster project was and the fact that they even launched this thing at all when they knew this had this problem, those two things together I think utterly changed forever the way the media and through the media the way the public looks at NASA. I think there really was a sense before then that these guys really are infallible, they really do know what they're doing. And if there was one lesson from Challenger it proved to everybody that even these guys are human. Even these guys can screw up. So it's kind of a two prong thing. There was this national consciousness of what a horrible mistake they've made here and what a human error that was and then the way they managed the disaster. From a public relations standpoint it should be a case study of how not to do it. In the wake of it they did every single thing wrong that they could do in my opinion as a reporter. And I think they could've done this, protected what they wanted to protect, but they could've done this in a way, you know you throw a few crumbs out here and people appreciate it. But they didn't do that.

Moore: How long was it between the event and when public affairs made a statement? Well obviously you knew when you were watching what was happening but . . .

Harwood: No, Steve Nesbit's talking on the NASA television the whole time you know describing what PAO is hearing, I mean what the mission controllers are talking about, you know, that here we lost impact, radar impact points, you know all this kind of stuff. But it was really, it was really the stuff that happened after the first day is what I'm talking about that did all of this damage. I mean on the first day they didn't know, you know, nobody knew what was going on. But very shortly thereafter they did. And there was a very, the astronauts you have to understand the whole astronaut culture at NASA and the nature of the way astronauts are treated and respected and everything else. And I don't, you know I don't deny them any of that, that's fine. But I think the hero status that astronauts get when they walk in the door down there that carries some baggage with it, it seems to me. And I thought it was unreasonable not to discuss the fate of the crew. Uh, I understand the human motivation for it because everybody knows their families down there and nobody wants to rub a family's nose in the death of a loved one especially in such a dramatic and horrific way as Challenger. But at the same time you know when an airliner crashes the NTSB goes and has regular briefings and tells you what they know and you know those families are no – the astronaut families are no better than the families of someone on a place crash. I hate to put it that way but it's true. It is something that is obviously of national interest and I can't imagine what it would be like to have someone lost on an airliner or the Shuttle, either way you've lost a person. But for whatever reason all of that was utterly blacked out. And it was just a bad thing. I don't know. You have to ask me some questions. I'm rambling.

Moore: Where were the families and the . . .

Harwood: Well, most of them were right down here in the parking lot. They were rebuilding, NASA has a VIP site where they can take family members and VIPs. I know Christa McAullife's family was right down here in the parking lot in front of our buildings. Some of the astronaut families go on top of the Launch Control Center, the LCC. I don't know where they were on that day. I don't remember. I know Christa's family was down in the parking lot very close. And we had reporters down there. Reporters could go to the VIP site and I remember we had Bill Loman, our Orlando bureau chief, was down there with Christa McAullife's family when the thing took off. And of course you know you've seen pictures. I mean people were shooting pictures of them when it happened.

Moore: For goodness sake.

Harwood: Yeah, it's just a sad thing.

Moore: How did the relationship evolve then? Suddenly we have all these new people down here. The relationship between NASA and the press has taken a huge hit and it goes down a different path.

Harwood: It really did. Well, there's two aspects of that like everything else it's not simple. The uh, you had a lot of you can call them hired guns, people that weren't space reporters that came down in the wake of the disaster. And of course if you're only here for a one-shot deal you can step on people's toes. You can tell them you won't quote them and quote them. I mean some people do act like that I hate to say that. Obviously a beat reporter who is going to be here after all of them are

gone has a different way of approaching something than somebody who doesn't have to worry about if he hurts somebody's feelings along the way. So there were a bunch of reporters came down. I guess the intensity stayed pretty high for about a month and then it started dropping off until you had a hard core little group of us left. You had the national media, the wires, AP, UPI, Reuters. CBS stayed here the entire time with Bruce Hall. They never left. There were folks – we all went out and bought high-frequency radios so we could eavesdrop on the Navy ships offshore for the. . . it was really funny they knew we were listening, they all had a code. You know we knew we thought when they were talking about the crew and the crew cabin and stuff like that; it was just an amazing little thing. We'd all listened to the radios and come in here and asked questions you know. And I remember we had night vision really fancy TV cameras. They'd go down to the port 'cause we could tell when they were bringing something in and we'd shoot these guys at night with these night vision cameras. We were there the night they came in with the first remains onboard that NASA would confirm were human remains, a very somber time. It was down in Jetty Park which is a public campground down here. The boats all have to come by this public campground. And here's this little clump of us with these high powered TV cameras and folks and I remember that boat coming in with those, all the guys on the deck were at parade rest, you know you knew that that was the crew or at least part of it. It was just, I remember it being totally silent, nobody saying anything, it was just this little ship going by with the crew onboard. Sad thing. And you know it just went like that. It was just a long, long process. It wasn't until March that they found the crew cabin. I remember it was a Sunday afternoon that they announced it. I think they found it on a Saturday. I was the only person out here that day; I was by myself on this entire press site. And I remember walking into the press dome 'cause Hugh Harris was here who was the head of public affairs and he was over here typing and I said, "What in the world are you working on?" He said, "We just found the crew cabin and this

is the press release." I said, "How long have I got?" He said, "You've got about two or three minutes." And I ran back to my bureau and filed a big bulletin. I got a lot of play on that 'cause I was the first person to report it out of pure chance and it doesn't mean anything it's just the way that it worked. Just out of the blue they told us we found the crew module seventeen miles offshore, something like that, in ninety feet of water. And then after that happened we're all monitoring the recovery operation because this wasn't gonna be over until they'd found everybody. And it got down to, there were two things, they had to find the crew and they had to find the part of the booster that failed so they could prove what they thought had gone wrong with it. And of course while all of that's playing out you had the presidential commission on the Challenger accident that President Reagan appointed. . .

Moore: The Roger's Commission.

Harwood: . . . the Roger's Commission, which was having hearings that we were covering here and there, most of them. The good stuff is, was all off the record in closed session where we didn't find out until after it was over. But we were covering all of that. Covering Jetty Park with the crew until finally they did in fact find the, or at least, when I say found the crew they found identifiable remains from everybody. And I think the last person they found, nobody that I know of knows who they were, I think it was Greg Jarvis, I'm not sure. That's when that process finally ended and they could have a ceremony, they could fly the caskets out. You've probably seen video of the C-141, the hearses and all or that. That was one bit of closure. The second one was when they found the section of the booster that had ruptured because you could clearly see it; I mean there was no question about it. And the third was when the commission report came out. So those were the three

big things that happened between January 28th and June when the, when the commission reported, reported its finding that just dominated everybody's lives. And then after that it was the recovery, is what do you do to fix it. When are you gonna launch the next flight, you know, all of that. But it had really changed. I mean in that three or four month period everything about how you cover space, about what your thoughts are about it, it all changed. And you know, never to go back the way it was clearly.

Moore: And your relationship with the center changed. You're connection, well you said you still went and talked to Hugh Harris. Was there still. . .

Harwood: Oh, no, no, no. No. When I say the relationship, no, the, no. Public affairs, in the aftermath of Challenger, was as professional as they could be. They had a management on top of them that wasn't letting them do their job. None of us who know these people ever blamed the public affairs guys for steering us down some bad road 'cause we knew it wasn't their fault. You know I mean there wasn't a question about that. I just felt sorry for them. They were not being allowed to do their jobs in my opinion. And it hurt them. It's like, it'd be like if public affairs took over and told them how to run a countdown. That doesn't make any sense 'cause they don't know about countdowns. Well, these guys didn't know about public affairs but the structure is such that they could do that and it was a big mistake.

Moore: So tell me about these, almost two years we had, two years between Challenger and the return to flight in 1988. You were here the entire time.

Harwood: Oh yeah. Very intense. You know, there were news conferences. We were following the booster recovery redesign effort. Flew to Marshall quite a bit at the space center up there to talk to these guys and to track it. At the same time we're following other big payloads because you know they're gonna launch Hubble that year for example. They were gonna launch a journalist in space that year. They were gonna launch the first DOD flight out of Vandenburg that year. Bob Crippen was in training as the commander and that was really gonna be something. We had been making, they were gonna launch the Galileo and Ulysses' missions within a week of each other with hydrogen fueled centaur stages onboard and you know radio isotope thermoelectric generators. It was really shaping up to be a big year when Challenger happened. But all of those payloads stayed in the pipeline of course. And as you begin to approach the return to flight you know, you're writing about the launch schedule and when are these things gonna fly, what are the problems they're having. And it was very intense until finally right up until the morning they launched and I mean that was as much drama as you'll ever see anywhere. The press site was packed. I want to say that there were twenty-one-hundred or twenty-two-hundred accredited people. They had so many that Safety wouldn't let them all even be here. They had to setup a second area over on the causeway for, for reporters because there just literally wasn't enough room for everybody.

Moore: So more here than were for the original _____ launches.

Harwood: Oh, oh, yeah. Oh, definitely. I think that for Challenger, and you'd need to check this, but I believe this rivaled the Apollo 11 press crowd. It was the biggest crowd I've ever seen for sure. And I'm pretty sure, I want to say a thousand were here for the first one. I think I read that somewhere, somewhere in that ballpark. But it was over two-thousand for the return to flight, it was a

big deal. And I have never been more nervous in my entire life that day 'cause again it was my lead. Rossiter was here this time but it was still my lead. I was just walking around like a crazy man trying just to stay, stay calm. 'Cause you just couldn't, it just made such a huge impression on me that day that it blew up. It just, it has forever ruined launches for me. I always tell people that I've got the greatest job in the world but there's, if you launch eight times a year, there's sixty-four minutes a year that I'm nauseous. And it's absolutely true because I'm just so fearful of something like that happening again. I shouldn't be but I am. I can't help it.

Moore: Well, it's an enormous amount of power.

Harwood: It's an enormous amount of power. And I think a lot of my colleagues don't understand. I think a lot of the public doesn't understand that. You know, it weighs four-and-a-half million pounds when it's loaded with fuel and it goes from zero to a hundred miles an hour straight up in ten seconds. And I always challenge people that don't know much about this, I tell them that, and I go think about that for that for just a minute, really think about that. Think about four-and-a-half million pounds being lifted up, straight up, and in ten seconds it's going a hundred miles an hour. That is amazing. That's incredible. And it means that the margin of error in a machine like that is vanishingly small. I mean you can't have a big hiccup in a machine like that and expect to walk away from it. It's just as simple as that. And you know, after eight and a half minutes it's going eight times faster than a bullet from an assault rifle, which is easier for me to visualize than seventeen-thousand miles an hour or five miles a second. I have a hard time, but I can, if you imagine a bullet going by that you can't even see if you multiply that by eight, it weighs a hundred tons and there's people inside, that's an amazing thing. And so I get nervous on launch day. But never like I did for STS-26, that was an incredibly

uncomfortable day. I remember Time magazine put an issue out – their next issue had the Shuttle taking off and on the front in big letters it said, "Whew!" You know, w-h-e-w-exclamation point. That's exactly how I felt when the engines cutoff that day. My goodness, thank goodness they got there. And you knew intellectually they probably would. The commander Rick Hauck used to say that this is the safest Shuttle there will ever be. More people will have looked at every part on this Shuttle than will ever happen again you know. I know that intellectually but at the same time if you were there for Challenger that's, you just don't ever forget that. And I don't forget it to this day.

Moore: Every launch.

Harwood: Every launch I think about those guys. I think about that day every single time this thing takes off and it's, you know maybe it's just a weakness in my character or something. I don't think it affects everybody that way but it does me. It does me. I think about it everyday.

Moore: Tell me now, you mentioned before this relationship that the press had. That the press before, they were willing to accept, they were willing to. . .

Harwood: Well. . .

Moore: . . . that NASA was infallible and after that it was changed to looking, looking for the other side.

Harwood: I don't, I don't want to give the impression that the media before Challenger thought they were infallible. I think I said that. It wasn't that. It was more, it was a more general thing. It was a more willingness to give them the benefit of the doubt. You know, yeah I made, that made, I'll give you the benefit of the doubt. I think that went away after Challenger. There was no more benefit of the doubt. And uh, it wasn't that people wrote nasty stories after that, although some did. It was more a question of I'm gonna go call this person and find out. And in the past somebody would say well I'll go track that down for you. You may or may not make them follow it up. Now you follow it up. Yeah, I want that information. Get it for me. Not because you don't trust them but in a sense it is because you don't trust them just because you want to know that this is really what's going on. So it's a, yeah there's no more benefit of the doubt. And I think, I think that their, NASA's response to Challenger from that public affairs standpoint is responsible for that directly and I think that was a bad thing.

Moore: Now there's some people who have kind of said that after Challenger from the NASA side that it took on a much more kind of investigative reporting zeal on behalf on the press. Did you sense that was the case by people coming down here?

Harwood: Oh, oh certainly. The New York Times won a Pulitzer prize for their coverage of Challenger. It was as investigative as anything you could hope to find. And they did a great job of it; so did other papers. There was certainly a lot of that in the wake of Challenger. That's when some of this talk earlier we were talking about how people thought maybe if we'd done this before people would have found out about the booster thing, which again I don't know that I believe. I mean part of that is because of the complexity of the program. You know I've often thought that if we had an

accident today, and I don't believe there's anything like the booster problem today, I really don't. I do believe that after Challenger I'm convinced that they utterly changed the way they do this and I don't think you could have a problem like that that would lurk unnoticed like it did. I just don't think it's possible. But in a program of this complexity there is always something being investigated from a failure standpoint, some pump didn't work right, some thing you know on this last flight – we need to go check that out. And I used to make the argument that you couldn't have another Challenger because that wouldn't happen and if it was just a random failure that did them in you wouldn't have the same aftermath that you had with Challenger. And Doug Ward a public affairs guy who's now retired at the Johnson Space Center said, "Harwood, you're wrong." He said, "No matter what breaks somebody somewhere will find a memo from somebody that questioned the part. Somewhere, somebody, something exists that you could say somebody should have known better than to do this." And he's probably right. He's probably right. So I don't know. But there was an increased round of investigative stuff after Challenger obviously but that's, that's gone away now. I mean that was in the aftermath of Challenger and the ramp up. And I think that most reporters, I think that most news organizations after they resumed flight and after this had been going on for a while began to really believe that yeah they did, they did solve this problem. They put a lot of astronauts in positions to have direct insight into these things and they are after all the guys flying it. And like I said I don't think that anybody believes that NASA today you could have a booster program run like that one was where you had a potentially catastrophic issue that was getting held back because you wanted to keep flying. I don't think anybody believes that that's even remotely possible today. So in that sense they've earned back some of that good will and trust. I think they demonstrated clearly that they're utterly dedicated to safety. I don't think there's any question about that. I think they're absolutely dedicated to that. I think that everybody in this program knows that if they lose another one then

they really could lose the program. I think they all know that. So I don't think there's anymore of this we're gonna launch at all costs kind of stuff. Or what Richard Fineman talked about, you know, it's not a –prove it's not safe to fly – prove it is fly kind of deal, prove it is safe. I think they're utterly dedicated to that. There's no question about it. So I think as their track record has gone on people have accepted that. At the same time is this track record when they've done their flights, the news interest drops off 'cause, just because it has been so smooth. You can't write on the front page every time a Shuttle takes off if it's the same thing as the last one. It's just not news by definition. Even though you can argue that four-and-a-half million pounds going straight up in ten seconds is news whenever it happens, I personally feel that way, but that's not the way the news business works with the possible exception of the White House. So the interest has dropped off almost in a sense that they're the victims of their own success. There's an indifference I sense these days until the next problem happens and then that will all start again.

Moore: We need to stop and change the tape start again.

Moore: Okay, we're back. This is tape two of the interview with Bill Harwood. I'm Patrick Moore with the University of West Florida and Kennedy Space Center summer faculty fellow. This is June 14th 2002. Se were just kind of covering that issue of the relationship the way it changed between Kennedy Space Center and the press itself and you had mentioned kind of this phase of being pre-Challenger/post-Challenger two different worlds. Tell me more about that and the subsequent years from '88 on and '86 on.

Harwood: Well there were two things I think, maybe three things in plays, one was as I mentioned in the wake of Challenger reporters and much less willing to give NASA the benefit of the doubt. And that colors a lot of stuff, it colors the writing, how you phrase a sentence. I mean you want to let the reader know that you're not positive about this, you don't necessarily believe it or whatever, I mean you know it's a complicated process. But they had lost that good will I think that existed that allowed reporters to give the benefit of the doubt. At the same time I think the public affairs office who again I hold blameless in all of this mostly because it wasn't their policy, their policy had been thrown out and they were being told what to do, is part of the reason the relationship got bad. These poor people stood there and got bashed for months and months and months. I mean seriously bashed 'cause this is their interface. . .

Moore: Public affairs down here?

Harwood: . . . big time.

Moore: This was NASA . . .

Harwood: No, I'm not talking NASA public affairs here, I mean across the agency. NASA bashing was the phrase we all used and it's absolutely true, just got hammered over all of this. And really it was quite mean spirited I think at times. I think some reporters felt like they were being lied to. Some felt like you're withholding information you don't have a right to withhold. Remember NASA's a public agency; they're chartered as a public agency. There was a lot of strong feeling with some justification that they just didn't have the right to do this. And on and on and on. There was a lot of NASA

bashing. And then of course you've got the fact that here's this booster program that you know in hindsight when you look at all of the material was horribly mismanaged. You know that they were launching this thing with a clearly serious technical problem you know and rationalizing away why we can keep flying instead of grounding the fleet and fixing this. That's hindsight but it's powerful hindsight I mean there was no denying that. All of those factors led to some very, very negative reporting, it all just played together. And NASA bashing got to be a big deal. Well at the same time you have a public affairs operation that has just been beaten over the head and shoulders repeatedly for things that's not really their fault. They're just trying to explain and I think there became on their side of the aisle a lot of resentment started building up in the way the reporters. . . so the whole relationship changed you know. There was always and us and them kind of deal but this was really much more, bitter's not the right word, less trusting, unfriendly, I don't know the right word for it, it wasn't pleasant. With exceptions, I mean beat reporters, guys that deal with 'em everyday you know that might not be quite, they didn't view me probably or Howard or Jay Barbree or guys that covered it all the time weren't probably lumped in with that but it was from the public affair's guys perspective it was a pretty grim time. So I mean it was bad on both sides of that street. And the third factor I was going to mention was that as NASA continued flying again after Challenger successfully they came under some real budget crunches because they'd spent a ton of money fixing the Shuttle. They had huge manpower looking at every bolt on the Shuttle and they started ramping that down and public affairs got caught up in the budget cycle as well as every other part of NASA and they started losing people. It was happening at the same time that reporters were losing interest to some extent. The two curves were going down together, but I think public affairs lost a lot of talent – walked out the door as they retired or took early retirement and they weren't being replaced. _____ the operation they lost a lot of corporate knowledge so that part's changed too. And then another

generation of reporters has come along. There's reporters now that you know were literally kids when Challenger happened that are covering the space program so you know they don't, they don't come in with that baggage and I guess that's something we should clarify. When I'm talking about this relationship souring it did in the folks that were covering it at the time. I don't know how much of that translates down to somebody walking in off the street to be a space reporter today you know because they didn't have anything to compare it against but I do. And as you look before Challenger it was a different operation.

Moore: Tell me more about this, this, this post-time? These new people that are coming in, do you sense what they're trying to communicate? Somebody fresh, somebody new, who's coming down for a launch or maybe has been involved . . .

Harwood: You mean a reporter?

Moore: A reporter.

Harwood: Um, I think there's some knowledge of, it's a combination of things as you can imagine. I think it, for the people that are covering it as science writers or space reporters there's a certain you know attractiveness of this story that's going to exist on any level whether it's pre-Challenger or post-Challenger, you know, you're watching a really dramatic thing, there's no question about that. And what they do is interesting and it's a fascinating story. Those people I think probably view it a lot more like I do in that sense but there's not that many of those people obviously. That's a small group of people that are full-time space reporters that make their living covering the space program, it's not

a big number. On the other hand you have people that are coming down for a launch that maybe an astronaut is from their hometown and their hometown paper sent 'em down for a launch. You have people coming in in that context to cover. I mean that's different, of course they've never seen it. There's a lot of enthusiasm just like the day I showed up for the first time you know that level, that aspect of it is still there. I think what's really changed is just the shear numbers that's gone down so much. It used to be that every major newspaper would send somebody down for a launch. These days they let the wires cover it for them. This last launch is the first one I can remember where the New York Times didn't have a staffer down here. They've always had a staffer here.

Moore: You mean for the first launch attempt?

Harwood: Forever you know they had a staffer here. And you'd have to check that. There may have been a launch somewhere along the line they didn't send somebody down but that's almost like the last bastion when the Times doesn't send somebody. And so it's dropped off to that level where they really are relying on the wire services which is really in this case the AP and Rueter. UPI still exist but they don't have a person on site anymore like they used to. At least I don't think they do. They might. You'd have to check that too. But it's down, it's down, it's not a significant factor. And then they have, you know, most people have contingency plans. I mean most of the big news operation's editors know that something can happen so you usually identify alright if something happens these guys go to the Cape but they're not sending them here in advance 'cause they don't want to spend the money on it. You know it costs a lot of dough to send somebody down here for a week to cover a countdown and cover a launch and it's just 110 missions in you know that's the dog biting the man, it's not news.

Moore: You mentioned your first flight and how you came down and you watched it and it was more a personal experience is why you did it and you really didn't see yourself as the, the go between, the translator, the voice that provides the knowledge to the rest of the world. When did you change into that mode, when did you recognize yourself. . .

Harwood: Oh, well. As soon as started working fulltime for UPI covering the space program I started thinking a lot more like that. My interest has always been, there's two ways to cover space, one is just the shear excitement, "Oh, Gee Whiz." There's one school of thought that wants to focus on the furry animals on board and the human interest stuff like you heard some questions like that yesterday, "What did you eat tonight?" "How do you go to the bathroom in space?" – kind of questions. There's another group, which I put myself in, that wants to talk about, well how does this experiment work and what is that going to tell you. I'm not saying one's better than the other, they're just different approaches and that's, that's what I'm interested in. And so, that, that's what I did. I mean, I would always try to write stories where I explained things that were going on in space. I'm not an investigative reporter. I'm not a political reporter. I would cover budget news conferences and things like that, but that's not my forte and I don't pretend it is. My forte is the technical end of the Shuttle. What did they do up there today? I can tell that story. That's what I do.

Moore: We talked yesterday and you had mentioned I guess, the milkman in Kansas City, is that how you put it, who you're writing for. This is your audience. You have an audience out there that cares. Is it a changing care? How is it that you see your audience and who you're trying to speak to if it is the milkman in Kansas City?

Harwood: Well, it's hard to answer that question, because the reporter here in the front end can't talk to the milkman directly. The reporter talks to the editor and the editor decides what the milkman's going to see. Most editors, and there's two editors, there's the editor from my own company who boils down what I have written and then there's, if you think about the wire services, there's an editor at the local paper that's going to look at what the wire sent out and decide how much of that they're going to let the guy, the milkman, see. There's multiple layers between me and the milkman. In the case of the AP or the UPI back in the old days, you'd file an 800 word story and then the editor on the other end of that going's to use some portion of that story. Very few of them would run all 800 words. Today, it's almost a brief. If there's not a major problem, the Shuttle is a story that today shows up in a national brief's column where it's given two or three paragraphs. That's what it gets in USA Today. And that pretty much is what the milkman in Kansas City is allowed to see these days is the couple of graphs in newspaper. Now, the web is a wonderful thing, cause that's a new thing, and you can get as much detail as you want on the web, independent of editors between you and them. NASA has an incredibly diverse and extensive web site that has a huge amount of information. People like me maintain web sites that have vastly more detail than you will ever see on the CBS Evening News or will ever see in the Washington Post, because it's the nature of the web. It doesn't have to be kept short. It's not competing against advertising or other stories of the day. I have Space website and I can put in there anything that I want. And so the information is out there that the milkman can go see, but the difference is he's got to go looking for it. It isn't delivered to him in the morning like it used to be. He's only getting a couple of graphs in the morning, paragraphs.

Moore: What kind of hits do you get on your website?

Harwood: Oh, I work for a couple of them. Spaceflightnow.com gets hundreds of thousands of hits during a Shuttle mission. It's an amazing thing. Lot's of hits. There are a lot of people in the world that are interested in space and the difference in the web is that a lot of those of hundreds of thousands of hits are coming from overseas. They're not coming from the US because anybody has access to this, it's all real-time. There's a vast interest in space out there. It's an amazing thing. I mean, if you look at the Star Trek phenomenon and I'm not trying to compare them, but I'm just saying there are a group of people on this planet who really want to get off the planet. They really want to travel around; the idea fascinates them for whatever reason. And space appeals to something in them and there's a huge amount of interest and people want to know this. I get email all the time from people that are double checking serial numbers on main engines. I mean, they're down to that level of detail, you know, that they're interested in. So I mean, it's something I don't think has been well studied academically in terms of what is the impact of the web versus traditional media. I can't answer that question, because I don't know. It's hard to track the web just by its very nature and to determine its significance, but it's a, certainly in the space world, NASA's web pages are routinely in the top ten pages in the world in terms of the number of people that go and hit their sites, routinely. So I mean it clearly has a huge impact, but quantifying that is something I don't know that anybody has been able to do yet. So, the milkman has access to the information, but he has to go look for it.

Moore: He has to want it. What about the common person, who's just. . .

Harwood: He's seeing two paragraphs in the paper if he reads the national briefs column. That's assuming there's not a major problem and there hasn't been one, since 1986. You know, the wire

services, I can write any amount of stories about some little thing that broke today on the Shuttle, whatever, but in terms of significance, zip. They've put together a remarkable program. It is remarkably trouble free, in terms of overall significance. You know, when you go back and look at anyone of these missions where you can read a whole bunch of stories about an APU failed or a mass memory unit failed, oh what are we going to do kind of stuff. You go back two years from it doesn't matter. You know, the mission accomplished its objectives. Nobody got hurt. The Shuttle came home, bottom line. So they've got a great track record. And, and there's, unless something really big happens, that's all the guy in Kansas City is going to see is a couple of graphs saying they did a space walk today, they replaced they wrist joint of the robot arm and it's working.

Moore: _____ (potentially) that's all the guy in Kansas City is interested in.

Harwood: I don't know what he's interested in. I don't know. That's what he's going to read in the paper. I don't know if he's interested in it.

Moore: Is there any attempt on behalf of the news media to say, do they just do it based upon advertising, what's going to sell?

Harwood: No, no. The media, you know, in the journalism schools is the concept of the gatekeeper which I'm sure you're familiar with and that's where the editor, the reporter starts the process by going to the news conference, or covering the event, and deciding what he thinks is the most important and he's making a judgment right there as to what he thinks is important. He puts that in the story, the editor reads it and the editor going to change it based on what he thinks is important.

By the time it gets to the end user it's gone through a couple of those gates. The end user is not getting a complete story. The editor, the end user is getting the story that the editor and the reporter think the end user wants.

Moore: So, in essence we have kind of this chain where you have NASA providing this information. . .

Harwood: Yeah.

Moore: . . . to the reporter who goes through all these stages down to the people in general.

Harwood: Yeah, somewhere the NASA message that they want to get out and the end user, there's a multiple step process that's going on there.

Moore: So you're kind of the first line, if you will, between NASA and the rest of the world.

Harwood: That's true in a traditional sense, in the newspaper and magazine sense, and to some extent television sense. It's not true in the internet world. That's the wild card in all of this, because I have internet sites nobody edits what I write. It is exactly what I write. And, so in that case there's only one gatekeeper and it's me. So the internet is a wild card and again I don't think it's been subjected to the kind of academic study that traditional media has, obviously. It's still a new technology, but it, that's a very profound difference. Anybody can put a website up and write

whatever they want, you know, without anybody between them and the reader. The reader just has to find it.

Moore: _____

Harwood: Yeah, I know, I know. So I mean what you're saying is true in traditional media. It's not true in the web. And the web is a big deal in space because space is one of those things that technically competent people get off on and technically competent people are people who use the internet a lot, by definition. So space and computers for example are two things that are big deals out in the web. You know, they get a lot of attention because of the nature of what it is, stories of that and the nature of the people that are reading it.

Moore: Looking at it from that vantage and maybe trying to balance between the two modes of delivery, if you will, from a reporter stance, how has NASA done in, during the entire scope of your time here, in communicating what it is that they're trying to communicate?

Harwood: I think that NASA, and again my only real professional experience is with the space program. I haven't covered the agriculture department. They have a press office, too. And I haven't covered, except tangentially, DOD's press operations or whatever, but based on my limited experience. . .

Moore: Strictly here, at Kennedy Space Center.

Harwood: Well, but, I'm trying to compare it other agencies.

Moore: Sure.

Harwood: I believe they probably do a better job than most other federal agencies that I've ever encountered personally. They put a phenomenal amount of information out there. It's generally professional. You can find if you, if you look for it, information on virtually anything you want to do. They've made very strong inroads into the web. They have a web presence that I think probably exceeds any other government agency by a large amount and it's a good web presence and very useful and it eliminates all the gate-keeping from a NASA standpoint, if you look at it in that regard, because they're putting their message directly to the milkman in Kansas City if he goes to their page. That's a big difference. In the old days NASA didn't have a way where they would directly get to that guy. They directly get to him today without any gate-keeping between them and the end user at all, which is another thing that's going on now that didn't go on in the old days. I think they've done a generally a good job. They, obviously, only want to tell you good news. That's, that's human nature and it's the nature of public relations anywhere. You know, public relations people don't exist to voluntarily tell you things that are wrong with their operation, but I think NASA does a good job. They're relatively, they're pretty responsive if there is something bad going on they will get you the answer that you need. If I would fault public affairs in anyway it'd maybe be on two fronts. They went through several years after Challenger where you couldn't read a press release about an experiment on the Shuttle that didn't have a line there, we're going to cure AIDS or we're going to cure cancer. They promise a lot with these press releases when they talk about the science the Station's going to do because they're job is to sell the Station, which you can argue about whether that's a sellable

project, but they've carried it almost to the point of absurdity in some of their press releases and the things that they talk about, what could come out of this research. You could have a very basic research project here that the scientists themselves are simply interested in some little aspect of the way nature works, but the press release, well if we find this maybe we can do this and it just, it just, it becomes absurd. So I think in their efforts to sell their projects they go a little bit overboard, but that's a small complaint. I mean everybody understands that. You know, nobody's going to really hold that against them, but I think it's kind of like crying, well if you do it too much then people just don't read the press release because they think, you know, this is nuts. So I think that's, some of that goes on, but in general I think they do a good job, they do a good job and this web thing and that's significant. Whether any of that translates into a bigger budget, of course, is another issue.

Moore: You mention the ISS. Why has the ISS not garnered the same kind of enthusiasm attention as the first Shuttle launch?

Harwood: Let me ask you. What do you think the ISS is going to do? What are they doing it for? Answer me and then I'll answer your question.

Moore: {Laughter} Well I have lots of opinions, but this is your interview.

Harwood: I want you to answer the question. You're a member of the public. What's the ISS going to do?

Moore: {Laughter}

Harwood: You don't know.

Moore: {Laughter} Okay.

Harwood: That's my point. You don't' know and you're an intelligent person. You're a college education person and you live in Florida. You don't know what it's going to do. Well, neither does a lot. . .

Moore: I tell a lot to my children. I've been doing a lot of reading on the ISS, so I'm not. . .

Harwood: My point to you is, my point to you is, that regardless of the public affairs and the press releases and the fact that there is a group of reporters that covers NASA fulltime, people don't know what the ISS is going to do because it is not intrinsically interesting. You know, it's just not.

Moore: But why? If you look back at. . .

Harwood: When you look back at Apollo the target is the moon. You can walk out your back door and see it every single night, okay, you can see the moon. You can relate to it as a, as a fundamental factor in human development and evolution and culture. You had the Cold War race with the Russians. Here are these guys, this shoe banging Nikita Kruschev beat us into space. How in the hell did that happen? You have Kennedy saying we're gonna go to the moon in nine years before we've ever even launched anything. These are amazing things. And then we did it. You

know, and then they actually landed on the moon. And I think that that is just, there isn't any comparison with that and with the Space Station. And in NASA's defense nobody says it is. I mean you know it's obviously a different program. But you're asking why doesn't the public connect to it and the simple answer is it isn't going anywhere. It circles the Earth in low-Earth orbit. It costs a phenomenal amount of money and the science they do is not easily understandable. It is good science but it is very esoteric. You know you're talking material science, you're learning how to build a better semiconductor or whatever. That kind of work goes on on the ground but you don't read about it everyday okay. You're not reading about it on the Space Station everyday. It's the same kind of a thing. The difference is the lab on the ground doesn't cost fifty-billion dollars. And uh, it's all of those things. It's, it is, nobody argues that it's good science. It is good science. But there's good science that goes on all across this country in research labs. It's just there's not a hardcore group of reporters that write about it. There is in this case but it's, the science is such that it's hard to make this interesting to people on the street unless you tell them it's going to cure cancer or cure AIDS, which is what NASA does but you know it hasn't done that. So I mean it's a very, I'm giving you flip answers to a complicated question but it doesn't, this project doesn't have the kind of grab your gut thing that Apollo did by definition or that going to Mars would have. And even saying that you know I have a lot of people that I know out there that think we should be going to Mars, you know that that's really what we should be doing. And I don't know that Mars would generate the kind of excitement that Apollo did. You can't take the event away from its times and the context of its times. The Cold War, all of those things, the nature of our economy, Vietnam, all of those things made the Apollo program what it was. And I don't know that that would exist even if we did, if we went to Mars tomorrow I don't know that people would care like they did for Apollo. I don't know. But I do know the Station isn't gonna do it or at least I don't, personally I don't think it grabs the publics imagination

other than you have people in space, that still grabs people's imagination. But the question is always what are they doing up there. And the answer is I don't know, you don't know, you know. I don't understand the science that's going on up there but I don't understand the science that goes on at Texas Instruments Lab outside of Dallas, you know, it's very complicated, very subtle stuff. It may pay off huge dividends someday. Maybe, maybe not.

Moore: The difference is it's my tax dollars, it's this versus that?

Harwood: Well no, you know, no it's more complicated than that because the Station, nobody who is a reasonable person would argue that you justify something like the Station on science. I don't. I don't think you can justify the Station as a research lab. Nobody spends fifty-billion dollars on a research lab unless you're inventing the hydrogen bomb okay or curing cancer. It's a combination of the science, it's foreign policy, it's the Clinton administration saying let's take these out of work Russian scientists and you know, let's make sure they don't go work for Kadafee in Lybia or something, you know, let's work together. That's a foreign policy issue. Let's work with the Europeans and the Japanese and the Canadians, let's make this an international project. That's a foreign policy issue. Let's keep American aerospace workers involved in one area that we really do still excel in the world and do better than anybody else which is aerospace. It's all of these things that make the Space Station what it is and justify the project. The problem with Station is that you have to look at it when you're writing about it from a news standpoint or whatever you don't write all of that in a story. What is the experiment about, what is the research? The original justification was science and so that's what gets written about a lot. And it's hard to sell it based on the science they're doing. It's not that it's not good science but nobody in a gazillion years would spend this much money to do

that science on the ground, it would never get past a committee. It's because its part of all of these other things that we're actually doing it but it's the science is what has to be sold when you write the story about it and that's a hard sell.

Moore: So how does NASA generate future interest? How can they connect these people?

Harwood: That's not my job my friend. I don't know. And it's not my job. I don't know and I wouldn't attempt to tell them. I don't know. From a purely personal standpoint, not as a reporter, I don't think they can. I don't think the Station is something they can sell to people. I think you can sell the being in space part because everybody loves to see people weightless I mean it's just, it's just something that just people can look at and go wow, isn't that cool.

Moore: Hence the respones to every question but one. . .

Harwood: But beyond, just being in space, I'm not sure the Station is sellable in the sense of having a big ground swell of public support from the people. No, not unless some amazing thing gets discovered up there.

Moore: You had mentioned yesterday that in some ways if NASA can't do this, I mean if they can't sell this or not that it isn't good science but certainly the challenges of how we _____(tie) people, how is it that NASA can continue to bank on the future?

Harwood: Um , I don' t know that I understand your question.

Moore: Well, the looking forward and certainly you have to say, well we've done this last year so therefore we need to continue doing this next year. We need to make sure that still get our, although less that one-percent of the Federal budget every year, how is it that they maintain that?

Harwood: Well, yeah but remember we've been focusing on the manned space program while we're talking here. We've been talking about the Space Station and that's just one aspect of all of this. It gets the lion's share of the budget I agree, but I think that if you look at public interest in space you would find that the public interest is not directly proportional to where the money gets spent. It's inverse to proportional, well that might not be true, but the unmanned stuff to Mars, the Galileo mission to Jupiter, Cassini's on its way to Saturn, which is going to be a big deal when it gets there. They're talking about sending something to Pluto. . . those missions and the Voyager, I'd put Voyager up there with Apollo 11, I really would, on an equal footing in terms of humanity, humanity's cultural awareness of the world around them, but you have to put the Voyager's almost equal or maybe ever more in term of shear data to Apollo 11 and then you have to bring Hubble in there because Hubble is just been, it's revolutionized astronomy without any question. And the Hubble sites, the Mars Pathfinder sites, all of those sites when I'm talking about web hits, huge numbers for those unmanned things. So I mean you can't when you're talking NASA you really have to look at everything and we've been focusing on one program that I as one person do not think is a great sell. The rest of these things are easy sells. And I mean going to Mars is as easy as it gets, I mean you know geez, there could be fossils there. I mean think if they find a fossil, you know, that's certainly gonna fuel some drive to go see what the deal is there. But these are, you know, NASA deals with fundamental, fundamental philosophical questions in a way that no other agency does. You could argue DOE does

because we're talking quantum mechanics at some level, but in the case of NASA you're talking about the possibility of life in the universe. They are actively talking about machines that can go take spectra of the atmospheres of terrestrial planets; they can, and by spectra you can see if there's industrial compounds in there, is there oxygen, which is a straight byproduct of carbon bases life. I mean in twenty years NASA's gonna tell us if we're alone in the universe, there's no question about that if the agency continues. So in that sense NASA has one of the easiest sells in the world because these are questions that are fundamental and they are intrinsically interesting and everybody that ever thinks about their origins or what all of this means, whether you're a Christian or a Zen Buddhist or whatever, these are things that naturally fit that part of one's thinking. So the Station is, you know, it gets a lot of money and some people may or may not think the Station's the greatest thing in the world but these other things they're huge and I think that they build just by definition.

Moore: You made a comment and I appreciate it and that was actually where I was trying to lead you back into some of these, these, these focus. You said something about Spielberg and Lucas and kind of their . . .

Harwood: I have a friend at the Johnson Space Center who blames the lack of interest in the space program on Spielberg and Lucas, meaning the manned space program 'cause he says they made it look so easy nobody really understands that what we do how hard it is and I think that to some extent he's right. We were talking about this earlier about the four-and-a-half million pounds going up and people don't understand that. That's some kind of strange number and, you know, you have to really think about that for a few seconds before some part of your brain goes wow. You know it isn't easy, it's incredibly difficult to put something up into space, it's incredibly difficult. And I think

again, I said this earlier, I mean in a sense they're the victim of their own success. They have only had one failure in forty years that has killed anybody. You know, I mean their success rate is really phenomenal when you look at it over history. You know individual experiments, individual Mars missions or whatever failed along the way, but overall this has been a phenomenally successful program and I think that people don't understand how difficult this is and so my friend to some extent is right. You watch Star Wars, you watch Star Trek, I mean or sure let's go to orbit – zoom and you're there – and it is not that easy, it's not. But is an appreciation for the difficulty a justification for doing it so that's a totally different issue but it's, again it's the dog bites the man thing, even if you did have that appreciation and you did know that I don't know that after two-hundred flights in a row without ever having a failure that your level of appreciation and interest would be the same after two-hundred as it was in the beginning. It wouldn't. That's human nature to some extent. And as NASA keeps launching these that factor in human nature I think plays itself out. The interest goes down just naturally.

Moore: Any other insights that you can offer to this process in your time here.

Harwood: (sighs)

Moore: Where do you see the program in fifty years from now?

Harwood: The space program? Oh, I have no idea. NASA is a political, it's a very political thing and I think one aspect of that is you know, I mentioned that I, you know, the agriculture department has a press office, it does, and the agriculture department spends a lot of money every year. But

NASA has this great video, they have Shuttles that take off and rockets that take off and people ride them and there's always a chance somebody could die. That is an intrinsic, that is something that people are gonna bring their cameras to photograph. NASA gets a lot of coverage for their portion of the Federal budget if you think about it. You know, how much of that gets through to the guy in Kansas I don't know, but they're getting more coverage than most people. And it is, and that by itself makes it a political beast because the folks in Congress that vote on the budgets, you know, they see all of this, they see this whether the guy in Kansas does or not, they do. They read the NASA bashing and contributed to it in the wake of Challenger and this is a cycle that goes on and on. NASA, the Congress, and the President, and the media, there's three people and they all dance together, you know, and the media is like almost a go-between between NASA and the government, you know, and back and forth and vice versa – all of these guys feed off each other and so I don't have any earthly idea where NASA will be in fifty years or if it'll even exists, I don't have any idea. I don't know.

Moore: Do you sense that privatization is on the future, something that would be of benefit?

Harwood: Again, I don't know. You know, without a cheap way to get something into orbit I personally, and it's just a personal opinion, I don't see how it'll ever happen. You know, it costs ten-thousand dollars a pound or something like that to launch a payload on the Shuttle, I mean you've gotta have that cheaper for, for commercialization, it seems to me, to ever take an interest in this. And then you have to argue about it, well is it the government's role to spend the seed money to develop the new vehicle and then let industry operate it or whatever, but there doesn't seem to be – that's another issue, that's a political issue and at this point I don't see any kind of budget increases

that would lead to a new vehicle any time soon, even remotely, I don't think certainly not with the Bush administration. But the beautiful about American politics is, you know, wait four years and something completely different can happen so I don't know. I mean if you had a President come in that was a strong advocate of space or thought that there was something there for us then he could make it happen maybe. If you find a fossil on Mars that could make it happen. If we detect any signs of intelligent life in the universe that could happen. Those are wild cards though. Based on what's going on right now if none of those wild cards happen then I think they're gonna fly the Shuttle for a long time.

Moore: What about China?

Harwood: Another complete wild card. Uh, they clearly are interested in a manned space program but their program is run by the Chinese military and it's very secretive and so I don't know anything that you haven't read yourself somewhere about what their intentions are. They've talked a lot but talking's one thing, you know, they've gotta put them up there and do it. They have inherited Russian technology for the Soyuz vehicle that they modified that they're gonna launch and that within the year we'll see Chinese astronauts in space. Whether they will go on to build a Station, go to the moon, or whatever I have no idea. But in terms of what could happen that could spur us, you know, an independent space program, an aggressive manned program to go back to the moon or on to Mars or whatever that could in fact spur us on to do something, but that's another hard to predict outside factor. The status quo doesn't, I don't see that changing in any significant way in the years ahead.

Moore: Well I certainly appreciate your time. I hope that if I have future questions that we can get back together.

Harwood: You can indeed.

Moore: Thank you very much.

Harwood: My pleasure.