

AUGUST 4, 2003

DR. ORVILLE BUTLER: Okay, we are in the archives at Kennedy Space Center this morning talking with Tom Utsman. I guess I'd like you to start off by giving us the quick version of your background, and how you arrived at Kennedy?

MR. TOM UTSMAN: I started out, I had a bachelor of mechanical engineering from the University of Michigan in 1958, and at that time, I didn't like the winters, so I decided – I took a job with (Shell? – inaudible) in Houston and worked offshore for awhile.

When I started, I was a bachelor, and then I got married in New Orleans, two (2) kids didn't recognize me for working offshore so much, decided it was time for a career change. I went to work for General Dynamics putting missiles (inaudible) from Mexico. After we completed that job, the most exciting thing looked like the Apollo program, so I went to work for a company (inaudible) VonBraun in Huntsville, Alabama, as an engineer, and worked for them for about a year- really only nine (9) months.

During that period of time, NASA was starting to hire up and so some people I knew in NASA asked me to come to work for them and I did in 1963, as what was known as the missile firing lab in Huntsville, Alabama. We worked there and then in 1964 the Kennedy Space Center was formed and they decided they would move the contingent of us from Huntsville down to the Cape since that's where most of our work was anyway.

So I moved to the Cape in July of '65 and still essentially designing launch complexes. My particular area of expertise, at that time, was the known as the Environmental Control System or the ECS, which essential conditioned the launch vehicle and the payload, prior to launch. In 1966, I became a – I was working for a fellow name Jeff Wasielski (phonetic), Jeff became the facility - Launch 34 – 37 Facility Manager and that job entailed managing the overall activities of contractor and supporting the building of Launch Complex 34 – 37. I was his Deputy.

We finished the Apollo program over there and moved over and did the same job on Launch Complex 39 and did that until '69, '68 or so. Then after the start of the decline of the Apollo program, there was a selection made, or people to go off for a one (1) year sabbatical.

During that period of time, I got my Masters at a local program. So I went to Florida State to study for my Doctorate in Business. I had one (1) year on campus, which was not enough, and so I got AVV, came back and upon arriving back, I was started as the Shuttle Project Shuttle Engineer for the Design Engineering Director. It was a unique position in that it was a dual position with the program. I reported to both design engineering and the project office. Running the Shuttle at that time was (inaudible). My job was to oversee the implementation of the conversion 39 facilities and everything that came with it, and to the Space Shuttle facility.

At that time, we didn't have – the Program – the Agency hadn't made a determination where they were gonna launch the Shuttle and so one of the key (inaudible) was what was called a two (2) site study. A site selection study and it was –

the question was – whether you could convert two (2) existing sites, that is the 39 and Vandenberg, KSC and Vandenberg verses a single site which was virgin Greenfield, (inaudible), Texas. Needless to say it was a charged environment.

So, my folks, (inaudible), that the manpower of the facilities, we were able to show it was more economical, when you considered all the range and everything else. So the Deputy Administrator at that time, George Lowe (phonetic), made the announcement and that's how we came to be the east coast launch site for the Shuttle and then our job was to run the project to get it completed.

One of the best things I think we ever did was build the plan on how to do that which was presented and accepted. It took about three (3) hours to brief the plan, so it was an extensive plan. Then we executed the plan and it worked fine. It came under budget and it just worked fine because basically, rather than get a prime contractor in, the Government, NASA, we acted as the prime, so we let some several hundred contractors, or facilities and equipment, and have everybody to use the Government as the integrator. The plan was essentially based on using specialists. Contractors were people who were specialists in the field.

For example, where the solids are, come in over at (inaudible). I remember the real cars are made by (inaudible), a company that does mining real (inaudible), so we had your basic real car and then the draft of it. So, all of that was standard things we had to do.

Once we finished that, and got it activated for, about 1976 or '77, I was moved upstairs, kicked out of that job. They didn't know what to do with me, and so

there was a guy, a Deputy of the Center, Jerry Griffin (phonetic) and he did the Griffin study, which I participated on, which was a look at what management schemes did the future of the Space Center have.

At that time, it was essentially whether you would have a Government operation, and basically was overseeing the development company. We came to the conclusion that you can have, essentially Kennedy needed, could, first of all, could use a separate contractor, use a contractor and we broke the activities of the Center into three (3) contractors. So that's what you needed and that the Government would have to operate (inaudible), which was more on the oversight then it was in the day to day operations, and in that case we came up with Shuttle Processing Contractor, the (Hardware - (inaudible) Processing Contractor and the Base Operations Contractor.

Then we (inaudible) that all over and there was a contingent issue in the Agency, but the Administrator at that time was a fellow, Jim Beegs (phonetic). Jim Beegs (phonetic) who liked it, and at the time Dick Smith was the Center Director here. The plan was good and it sat on the shelf, because we hadn't even launched the Shuttle, so it sat on the shelf and we finished it in '77. Briefed it and everybody liked it then.

Then in 1981, right after the Shuttle's first launch, Jim Beegs (phonetic) came down here and I remember we had a Sunday night dinner at the Officers Club and his question was very simple and direct. How can we save money? So we planned on, how can we save money on the Shuttle. Well, of course that was the idea that we had, that the Griffin Committee had come up with in '77. So we came back Monday morning

bright and early and, there was about four (4) or five (5) of us, and we went into Dick Smith's office and at this time I'd been moved over to (inaudible). I moved to technical (inaudible) in '79.

Anyway, we said why don't we dust off the Griffin report. Well, Dick Smith called up Jim Beegs (phonetic) and thought that was a wonderful idea. No problems at all, why don't we see if industry was interested, so since nobody had done this kind of thing, we were consolidating some 17 contracts in similar portions based on (inaudible) and knew we were breaking a lot of (inaudible).

So we starting coming up with (inaudible), one of them was to (inaudible), that was somewhat unique. (inaudible). Every five (5) years or seven (7) years somebody, a new contractor be brought in for some different work or follow up.

DR. ORVILLE BUTLER: So what happened, were the employees that worked out here, 25 – 30 years and never got (inaudible).

MR. TOM UTSMAN: (inaudible) You ended up having your pay, development rate overhead, something like that, and overlapping overhead that you (inaudible). So it looked like it would save money, but I can say it started breaking (inaudible), so we spent a year on it and I was in charge of something called a (inaudible) Development (inaudible), which was (inaudible) beyond what we were doing, which was essential to figure out politically how we can do it, cause it was like my feeling with the Presidents Cabinet. They may all hate it, but it got the President's vote and that all you need. (inaudible)

We enticed industry by making the Shuttle contractor a 15 year contract, which was a set of contracts potentially with 15% of (inaudible), which was really fairly unique at that time. (inaudible) decided the contract, which was Five Million dollars. It attracted interest. So we got a lot of people interested and then the question was, well, how the hell can they get smart enough to bid on a contract.

So we developed, came up with something called the, I don't know what we called it, but essentially it was that the contractors could come in during it, and we would provide them access and they could watch any or all of the operations they wanted. They were restricted, I think, to (inaudible).

And so based on that, they could (inaudible), and as a result of that, base operations went fairly smooth and Bob Long (phonetic) ran it. JoAnn Morgan was (inaudible). I don't remember if she was the source board co-chairman or chairman or something. She was deeply involved.

That when we brought EG&G in for the first time, was 10 years essentially the contract. Then we bid the SPC. By that time people at the other Centers, like Johnson and Marshall were worried because this, all of a sudden, took them out of what they called, real control. So they fought it tooth and nail, so knew we would not bring it, that nobody would look at us (inaudible) legitimate procurement with all sorts of dissention, so we decided that we would go for somebody at Headquarters.

The guy, Phil Cumbertson. Phil was Chairman, he was sort of one of the top people at NASA Headquarters and made it a Headquarters Procurement, not at

Kennedy. By doing that it opened up – it helped get even then, there were review committees and stuff like that.

Here in the battle with (inaudible), but it ended up the SPC, Shuttle Processing Contract was won by Lockheed.

DR. ORVILLE BUTLER: Who were the primary opponents?

MR. TOM UTSMAN: What they had was Boeing. They (inaudible) a joint venture with all the (inaudible).

DR. ORVILLE BUTLER: I mean when you were talking about opposition within NASA to the development of the single contract, because they felt they would lose control. Who were those people who were concerned that they would lose control?

MR. TOM UTSMAN: Chris (inaudible) The JSC plus hundreds (inaudible). At Marshall who was Lucas, who was the Center Director, and Bob Lindstrom (phonetic), who I never knew whether Lindstrom believed it or not, he fought it. So I've often said if I (inaudible). It was a battle (inaudible) and I still to this day, is competition. (inaudible). But we did not believe we could get the rates for (inaudible). We wanted a, I don't know if you're familiar with deal rates verses corporate rates.

But for example, we may be paying 14 – 15 percent of general administrative overhead, which includes an amount of independent research to somebody like a Rockwell, who would (inaudible) west coast rates and we were looking at getting field rates, where we would pay no more than 3 -5 percent. So it looked like

to us, you would save in the order of Fifty Million dollars a year and get the same job done and the question was, could you get the same quality. Hell yes.

Well, in the negotiations, they widdled away at the Fifty by adding in other areas, so it ended up, my memory says about, Thirty-five - Forty, we got Fifty on the Contract, but the add ons for the others, I'm not sure. That was why after we had the SPC, then we went on to USA today, same idea and it was to eliminate some of those add ons that I always felt were extortions. Which you paid the price to start down the road, and that was that.

So, back on my first (inaudible), I went over to technical support, after the like '77, I was on the Griffin Committee. In '78 I was the gunslinger of all gunslingers. They called me (inaudible). Logistic systems, you name it, they had a problem, they called me, and at that time, Lee Shearer was the Center Director, so they didn't really, like I say, I had the feeling it was almost like one trick (inaudible), but I had offers from Industry and stuff like that.

At Headquarters, but then they moved me over to tech support in 1979. They had an opening and they moved me over there to their pre-cursors for the senior executive service. '80 was the year I ran the operations, tech support and I was promoted to run technical support, which at that time was a large agency – which according to the Griffin Study we ought to limit, which was fine with me. My charter was to slim it down because it was (inaudible), and it was very obese organization. And my people were (inaudible), so over there my job decided to get it ready for the Shuttle

and everything, was to figure out how to get rid of civil service. We cut it down about 100 – about (inaudible).

So, we started the Shuttle and then I was still running technical support. On STS4, there was a (inaudible), George Page had passed away. George was a Launch Director, so he was a great (inaudible). He had heart and so they set it up for me to start on the STS (inaudible). They named it before, but as STS5 I would be in charge of Launch Operations and we would, at that time, eliminate technical support – combine that with launch operations, break off the (inaudible), and do a complete realignment of the organizations and we did that.

I did have both jobs for a few years. And then we just started launching Shuttles. Best thing that ever happened to me was a guy named, Bob Sieck. I recognized Bob's talent and he created the Shuttle structure, which was a Launch Director is separate from manager, (inaudible), and with his job essentially just to concentrate on launching the vehicle,

And to start him off, they came up with something called the Flow Director. We didn't need Flow Director, and didn't have two (2) vehicles until Challenger came and so, I forgot who took... We put Tip Colon and there was – Bob was actually the Launch Director, so he had that job for about forever. Then in '85 we decided that the "Shuttle" wasn't the Shuttle, so we split the engineering away from operations – we did that in mid-85.

The idea was to have Bob Sieck run the operations and be the Launch Director. The idea was we were gonna do some things that I thought were natural.

We were gonna do two (2) things. We were gonna start taking over sustaining engineering from the development Centers. That would go to the engineering (inaudible).

If you've got a system where there are our people, our civil servants and contractors, were understanding the vehicle, this came from my experience, after you designed it, you turned it over, unless you have a lot of problems. The day by day knowledge that's picked up by the operation folks is far superior than (inaudible) that designed it. So the idea was to take over the sustaining engineering and those mature systems which worked really on being (inaudible).

The idea was to first take it over, was the civil service, use and let me give you an example of system hydraulics – orbiter hydraulics. You say, well, orbiter hydraulics was pretty mature, stable, so we would use our own hydraulics people to be the system manager for the whole system and he would run the design elements at Rockwell and the operations on it at the (inaudible). Then eventually it became more and more mature, you could phase out, not down, phase out, the design folks out in California. Well, I negotiated that one with a guy named (inaudible), at KSC. The second area was logistics and it was essentially just a mover of logistics at KSC and hit everybody up. This was what logistics concept has been since that time.

Well, I was supposed to go to Headquarters, (inaudible) told me, you get this stuff straightened out, you go to Headquarters. Well, I was scheduled to go to Headquarters in February of '87. Of course the Challenger accident came the last of January, and so since (inaudible) said we're in for a lot of changes, (inaudible)

sustaining engineering, but we would go ahead with logistics. There were a lot of reasons for it. It made a lot more sense and Bush begged for the (inaudible), in December of '86 (inaudible). Like Mike said, we implemented (inaudible).

We brought in – we had the investigation and they had the Rogers Commission and then NASAS had a support team which was essentially (inaudible). Dick Truly (phonetic) was the spokesman at the (inaudible) in Washington. The guy (inaudible) the accident investigation was Thompson (phonetic) Jay R. Thompson (phonetic) and JR had been to Princeton. He had been at NASA for a lot of years and left early and gone to Princeton and was head of operations at the physics lab up there, and he came back and he headed that.

We had four (4) teams and I headed one (1) of the teams, so we went through that. So I spent like four (4) or five (5) months around the clock working on the accident investigation and supporting the Rogers Commission. Our team was lined up with the Rogers Commission team. And JR had a funny. You just didn't do your own thing, you were a (inaudible) team, you did (inaudible).

So in a way it was interesting, I got to go through all the (inaudible) analysis, (inaudible). So we did that, and based on that Dick Smith retired, who had been the Center Director in '79 to '87. He retired and left the summer or so, of '87. Meantime, back in '85, when I was with the organization (inaudible), George Page had been the Deputy, and I was named the Deputy of the Saturn and then about '87, Dick Smith left and we were without a Center Director and then Jim Fletcher (phonetic)

came on, Spring, late Spring to head the Agency and he (inaudible) to be the Center Director, in September of '87.

(inaudible) asked if we had the right organization to run the Shuttle, so I put together three (3) operations guys, three (3) engineering guys, who had a tendency to (inaudible), and a guy who I have great respect for, Dick Lyons (phonetic). I'd known Dick for a lot of years. Dick had been my Deputy when I was Shuttle (inaudible). He headed up Logistics and Space Station and then he retired and headed up, I think he headed up a contract.

They headed it up and they came back and said the only way to do it was to pull together since the return to flight, so the next question was, well who should (inaudible), He said, well, you should. Go back to what you used to do. So I did (inaudible) for the first three (3) years. I stayed as the Deputy. I had two (2) hats – Deputy and I had the (inaudible).

Well then, Headquarters changed again. Truely (phonetic) became the Director of the Agency. He had a guy, Phil Lenore (phonetic) who was head of (inaudible). I don't know, at that time it was called Manned Space Flight. I, frankly, didn't want to continue on launching vehicles (inaudible), so up at Headquarters there was a guy named, Howard (inaudible), and Howard had administration and training and so he finagled the system up there, so I was nominated to go to (inaudible), to the advanced management program. You can't launch vehicles over highways, so (inaudible), so what we did we, are you familiar with the Smokehouse?

DR. ORVILLE BUTLER: No.

MR. TOM UTSMAN: Smokehouse used to be, I guess it's still there.

There's this room on the second floor and (inaudible).

DR. ORVILLE BUTLER: At Headquarters?

MR. TOM UTSMAN: Yeah. All the organization structure, all the supervisors, anybody on the (inaudible) team and we would gather there. Center Director and a few key people would pass judgments on promotion, organization changes. I mean that's where we really had business. If you ever talk to George (inaudible), he was the keeper. George, that's where we did a lot of things. But, where was I.

After I came back from (inaudible), well going to (Harvard?) broke the bond with Shuttle, and so I had (inaudible). Bob said, yes, and it was during the week, and we had a weekend and he came in Monday, (inaudible), myself and Bob Sieck, I don't want to be... I want to be Launch Director and that's all I wanna be, so then (inaudible), (inaudible), (inaudible).

I didn't feel there was anybody at the Center who had the respect, lot of interactions (inaudible), the guy, Jay Honeycutt, became Center Director. Jay had a lot of connections. He was Deputy for Program Integration, so I suggest to him, Forrest (phonetic) checked it out and it was like shooting fish in a barrel, because Honeycutt was the big buddy in (inaudible) and (inaudible), so it didn't take much for that to happen.

Went off to Harvard? And came back and he was the Deputy. (inaudible). (inaudible) (inaudible) Late in the year, 1999, (inaudible) came in and asked me if I'd

go to Washington, (inaudible) with a lot of fine responsibility, so I agreed I'd try it. So I went up there. So I moved up to Washington and January of '99 and I stayed...(inaudible), Truly (phonetic) left, and then came Golden (phonetic). Golden brought in a guy, Chip Pearson (phonetic). The guy, I thought I would leave, because frankly because I had personality conflict.

DR. ORVILLE BUTLER: With Golden?

MR. TOM UTSMAN: (inaudible). But (inaudible), he brought in Brian O'Conner (phonetic) would (inaudible). I had a lot of respect for Brian. Brian had asked to (inaudible) several times. He came, so I said, okay, I'm staying. And then also the Shuttle program (inaudible), because Crippen had been there. They moved Crippen down here to take Forrest (phonetic) place. There was no Shuttle program (inaudible). And then we tried it without (inaudible) and it didn't work.

(inaudible) was Director and we about killed him cause he had (inaudible). Not many people realize that the (inaudible). So I took over and did that. Pearson would run interference, unless it was absolutely impossible, so I did that. About 18 months or so.

I had a death in the family, son-in-law, in '94. It was New Years Day, 1994 and so I was off for a month. My daughter was in bad shape. I thought my (inaudible). So, they transferred me down here, made me, I was a special assistant in Florida, that's what my (inaudible), office here and office in Washington and they made Brian O'Conner (phonetic), Shuttle (inaudible) Director.

I starting working, 13 straight weeks at KSC, every weekend coming home, so I was there but (inaudible). Jed (phonetic) got the ax in November of '94. I disagreed with Golden, so I just decided he was going. But I just think (inaudible). And so I retired in '85 – March 3rd.

DR. ORVILLE BUTLER: Let's go back to the beginning when you arrived at KSC and you were involved, you indicated, initially out at 34 and 37.

MR. TOM UTSMAN: And 39 too. I did the (inaudible) controlled 39. I was asked to go.

DR. ORVILLE BUTLER: What were the problems at that time?

MR. TOM UTSMAN: Well, essentially it was reliability. On paper you could see (inaudible). For one thing there was a great difference of (inaudible) for reliability, manned space than there is in (inaudible), so it was a more conventional approach. 34 – 37, I redesigned 34 -37 system, which had been changed for the proverbial low bidder and absolutely didn't work cause the (inaudible). SA6, so after that a guy, Rocco Petrone, was all over everybody and Rocco wanted it redesigned. Give me an example of what you could do and (inaudible). I was not cheap, when I got done it was (inaudible). You didn't ask about the swing arms.

DR. ORVILLE BUTLER: Yeah.

MR. TOM UTSMAN: Well, swing arms to me is a fairly simple (inaudible). We went in and tried to do what's called a detailing (inaudible). (inaudible) that's the contractor who gets it, and all he does is take the drawing and he's gonna find a zillion little mistakes and he just sends in changes. So, I don't know

who did the design, may have been Hayes. Hayes started this change order and there was a guy, Bob Moore (phonetic), he was in charge of that. His branch anyway, he wouldn't listen to advice, so he did it that way and (inaudible).

Then they brought Dr. King (phonetic), who never did a detail, and he could do detail – never contracts. The guy got it straightened out by diverting it from (inaudible), so that it (inaudible), but got it fixed. That was essential. Swing arms aren't bad (inaudible). If they don't work and we had one (1) that didn't work on SA10, and (inaudible). If you can avoid it, you avoid it. That's why.

(SIDE 1 OF THE TAPE ENDED, AND THE FOLLOWING CONVERSATION IS WHAT CAME NEXT)

MR. TOM UTSMAN: Because, that was because (inaudible) what you want is a clean pad with everything going at the base, so (inaudible). Swing arms went that way. I know now there picking on the (inaudible), because they do the same thing. We worked our tails off to make sure the cold arm folks (inaudible). Explosives, bolts and stuff like that are something people (inaudible). We went a long time because (inaudible). Much more reliable. (inaudible) (inaudible) Jim had the (inaudible) and the swing arms just are bad (inaudible). (inaudible) (inaudible)

They had a hydraulic power, hydraulics could fail. I remember the one on 34 failed, yeah 34, on SA10, (inaudible) cracked by a technician (inaudible) and it shook. Went out to one of those old pads and stopped (inaudible) especially 34, because 34 was built just for four (4) launches and of course, let's add a little more.

We used to call it Old Shaky. Tower would actually get up there and shake and (inaudible). It was not a sturdy pad.

DR. ORVILLE BUTLER: How much did you interact with Colonel Scheller, (phonetic), who was in charge of site activation?

MR. TOM UTSMAN: Not very much. At that time, I did my systems and when I became the manager of 34 – 37, he wasn't interested in 34. If he was I wasn't aware of it. 37 he was really (inaudible). Like I say, I didn't get into 39 until after (inaudible).

DR. ORVILLE BUTLER: Did you have any problems with configuration management over there on 34 and 37?

MR. TOM UTSMAN: Did I have problems? In what way?

DR. ORVILLE BUTLER: Either failure to configuration management ending up with configuration problems or being to (inaudible) of (inaudible)

MR. TOM UTSMAN: Not to my knowledge, not that I'd remember. The only other configuration I remember was embarrassing, was on the test (inaudible) on the slide wire. It's (inaudible), pad that if they went too far they hit into and it was too low. (inaudible). But other than, configurations, we issued everything (inaudible). Went through the whole thing. When I used to run configuration control (inaudible), so everything that was put on officially. When somebody made unauthorized changes, I didn't know about it, or (inaudible). I just don't recall any.

DR. ORVILLE BUTLER: When were the administration control boards established?

MR. TOM UTSMAN: '66. It may have been before.

DR. ORVILLE BUTLER: One of the things that we're interested in probing a little bit, when Scheller (phonetic) came in here in. I believe it was October of '64, originally Sam Phillips (phonetic) wanted to send him to Huntsville to establish configuration management there, and he came down here and (inaudible) problems with him here?

MR. TOM UTSMAN: We did not have the Air Force on the standard configuration control. On the ground systems, the, I remember Dr. Debus getting on (inaudible) Rocco Petrone. I had a failure on a (inaudible) that was gonna cause a delay and the value was called (inaudible) or something and they made two (2) or three (3) million of them a year, and the question was, is what the problem was that got (inaudible). When in effect, it was (inaudible). And when I first picked them out they had no (inaudible). I talked to the chief engineer and he said, well hell, we're doing this all the time. (inaudible) And I said, how do you know.?

You don't change the car numbers in the (inaudible) system. Serial number we know... (inaudible). You got to decide at what level your configuration (inaudible), so problem was on that one valve, (inaudible). To replace it we'd have to replace (inaudible) valves. (inaudible) So there wouldn't be any delays. We had a delay on the vehicle people (inaudible) to lay on the ground and go crazy.

So, they don't understand the ground systems, so that's what your fighting, so we did put configuration control (inaudible). Like I say I was also on a working crew (inaudible), '66 - '67 (inaudible) and we did it as a volunteer group.

DR. ORVILLE BUTLER: You know, we have the winding down of Apollo and you're in charge of converting 39 to Shuttle, what sort of problem did you have focusd on in that conversion?

MR. TOM UTSMAN: 50 Millions dollars. The conversion, they put a price tag on. Shuttle was controlled by all these benchmarks and stuff, so that was Debus, who was Center Director, felt very strongly. I had to report to Debus once a month with where our estimate was on (inaudible). The second part of the pressure, was to utilize all the facilities. Whether it be (inaudible) existing facilities, was a lot of pressure.

In fact, the solid rocket facility, booster facilities, the (inaudible) facilities that are up north, I was asked to look at through the compound, the Titan complex 41 and share it with the Air Force. We figured out how we could do it. The Air force wasn't happy. We had a guys come down from - one (1) of the congressional staffers, he looked at it and said, are you sure you really want to do this? And finally John (inaudible) said, Program Director looked at him and said, oh (inaudible) Center built, it too much of (inaudible), and so that was pressure. Then later on, it got to be, safety issues. People housing people. It only started, you can house them in the VAB, nobody.... Apollo they (inaudible).

DR. ORVILLE BUTLER: They put ordinance out at the pad.

MR. TOM UTSMAN: Yeah, I know but they also had (inaudible) But that was a command decision (inaudible). And Debus, and the safety director and both of them passed away, who felt it wasn't unsafe (inaudible).

And there was a guy Phil Willy (phonetic) who was controller at NASA, and I remember him grilling me, Tom are you sure you want to do this? I said, that's our position and I'm sticking to it. (inaudible). Trying to fight the Center Director and head of Safety, that was one of the (inaudible). Other than that everything went pretty smooth.

We had gone to school on what had happened in previous programs and so the management scheme was set up. We were set for contractors (inaudible). When we had people pricing projects (inaudible). We had absolutely no problems and as a result of that we finished four percent (4%) over (inaudible). That's unheard of. Then we did almost everything, I'd say almost ninety-six percent (96%) of the contractor, fixed price contracts (inaudible). After giving you the horror story (inaudible).

It was just business, figuring out how to do it and (inaudible). Compared to Apollo we went (inaudible) compared to Shuttle.

DR. ORVILLE BUTLER: What brought about that change?

MR. TOM UTSMAN: One of the things I knew we had to have discipline, but I had some people around me who believed in (inaudible).

DR. ORVILLE BUTLER: I mean certainly during the Apollo you had some very difficult people, Rocco Petrone, could manage details all over the place. So what it that made the business side of it, the lack at Apollo, and then tighter on the Shuttle?

MR. TOM UTSMAN: I have disagreements. I think it's the amount of money. I don't feel, (inaudible), who had control of the money for the Apollo

Program (inaudible). He worked for (inaudible). He doesn't agree, but I think we had more money. I didn't have anything to do with the GE contract but I know they asked how many three (3), four (4), six (6) or something like that (inaudible), so it was just a different environment.

DR. ORVILLE BUTLER: The GE contract dealt with the what?

MR. TOM UTSMAN: Well, the ended up being support on the electrical side. You know I think they wanted them for some kind of safety and reliability. Never did figure that out. (inaudible), but then they had Boeing (inaudible). I got over to 39, we were running two (2) schedule systems. You run two (2) scheduling systems with 200 (inaudible) crews, their never gonna (inaudible). It's just the law of nature.

And so, I was asked by KSC managers, just have an interface - one (1) person's got the first part of the schedule, one (1) person's got the second part, and no overlap. That way you only got one (1) schedule. But it (inaudible). Everybody was looking for the (inaudible) items.

DR. ORVILLE BUTLER: And how did the Boeing (inaudible) contract come about?

MR. TOM UTSMAN: I don't know. I mean that's above my table.

DR. ORVILLE BUTLER: It was brought in around June, the letter contract was in June of '67.

MR. TOM UTSMAN: Yeah, I mean there were. I mean I could only put myself in their position, and I would guess there were tremendous pressures going

on. So if anybody thought there was something. Boeing had been a big help on the (inaudible). So, I think he was looking, concern about, he was looking, they had Belcom (phonetic).

I do know that - there was a guy, George Miller, who was the Associated Administrator of Manned Space, (inaudible). Phil (inaudible) told me that Miller did want - he wanted to make the call on (inaudible), and not have the Centers involved (inaudible). But I think there was a lot of the feeling that got these Centers (inaudible), therefore, you got to get them under control and how do you get them under control, and (inaudible).

They started with a company called Delk (phonetic), which is (inaudible). They were relatively small and I (inaudible). We had one guy, I thought he was a pretty smart guy, and would ask good questions, but then we got herds of people (inaudible). So, I think it was Headquarters that jumped in, and increased visibility and control over the Centers. That's how it (inaudible). Yardley (phonetic) used to kid me, you know, and he'd say, master still lying to ya? I'd say, who do you mean? He said, the Centers. You know, and that was his attitude. Never trust them. So I think that was their (inaudible).

DR. ORVILLE BUTLER: And you're in Headquarters?

MR. TOM UTSMAN: It's a (inaudible), but you realize it's futile. I think it's futile.

MR. TOM UTSMAN: How did the Centers deal with, I mean, they were fairly independent minds to begin with. What was their reaction to these (inaudible)?

MR. TOM UTSMAN: I think they figured good ways to use them and work around them. I mean we had 28 or 29 thousand people (inaudible). It's hard to figure. But if you're afraid and you got the money, what's - nobody gonna complain except the Centers. And the Centers, and you don't complain to somebody who gives you the money. They had to figure out how to work. That's my, I may be cynical, but that's looking up the stovepipe and (inaudible).

DR. ORVILLE BUTLER: (inaudible).

MR. TOM UTSMAN: I would hope so. I'd hate to be completely wrong.

DR. ORVILLE BUTLER: Let's get back to Shuttle. We had the last Apollo flight, or our ASTP, about '75 and it took a lot of time from that before you had the first Shuttle flight. Now I know you were over on facilities.

MR. TOM UTSMAN: No, we got facilities done, I think, about '77. Hell, we got everybody so trained and bored. But they had on the Shuttle, the problem with the tile. Because of the funding constraints, they had laid out the (inaudible) essentially line them as high as they could, in order to keep the spending curve, because we were, the whole program was, (inaudible). We did not (inaudible).

This brings you to the problem with the tile. The tile was not to start until '77, fiscal year '77. Anytime you start anything, start things in fiscal years, rather than

somewhere (inaudible). And because they thought it was easy and they didn't realize that they had fairly simple problem. The tiles are ceramic, and its (inaudible) to aluminum, they got differential expansion with the heat. You got to have strain isolation and it's gonna bury every damn thing. It's not gonna be the same.

One size won't fit all, so they had to race around and find a ton of structural engineers to work that problem because you had to have the structural analysis of how much movement you had to – several profiles and (inaudible). So the tile took a lot longer than anybody thought and then they had other problems. There was supposed to be an all weather vehicle, and they flew the first one here from the west coast, flew it through a rainstorm and tile separated, and so they knew the tile was waterproofed. They had to waterproof the tile.

There were a lot of things they didn't know about tile. So, my view is that the tile became what I call a (inaudible), but everybody got out of that (inaudible). The engine people loved the extra (inaudible). So the tile gave everybody (inaudible). Things like that were happening.

Oh, and when we took the first test vehicle to the pad, the (inaudible), popped off the tank. There you have your first tank and you're looking at it and see, holy shit, I was tech support and (inaudible) Dr. Lucas coming in and saying, you gotta save, save the program. Figure out how the hell we can do something with this.

So we came up with some technicians. This was a Friday, full support. Saturday morning I'm out there and they bring in the high crew, and they say, well, just put a girdle on it. Get it back to the VAB. Course (inaudible), so we took some cargo

netting, wrapped all around it and tied it together and rolled it back to the VAB and Martin came in and tried to figure out how the hell (inaudible).

And then to save time, we took it back to the pad unrepaired to do the repairs at the pad. Well, the pad had never been designed, this gets back to the philosophy way back when, which was to keep the pad bare, do everything back at orbiter processing facility. All you do in the VAB is integration and check that you did that right. Then you get to the pad, pour in the gas and – so we had to do a construction project at the pad where we had every iron worker in the State of Florida. Got the unions cause (inaudible).

We had 300 Iron workers. That's a lot of 'em. Cleared out Disney – they were building Disney at the time. West coast, everybody was working around the clock. Safety made one (1) inspection and that was it. (inaudible) We were capable of putting (inaudible), stuff like that. But it was one (1) thing or another.

Then they found out it was like acoustics, it turns out it gets acoustic fever. The engines. We had gone out and got all the experts and I still remember out in California, we ended up in this Tahitian village. (inaudible – several sentences) We thought we had that fixed, we did, except something new they were testing down in (inaudible) they found that the acoustic energy coming out of the engines, (inaudible), and kill the engine, so we had to put a water system in. We didn't find that until STS3. (inaudible).

DR. ORVILLE BUTLER: So there were (inaudible). STS2 could have had the (inaudible)?

MR. TOM UTSMAN: So that's when we put that in. I wouldn't have (inaudible) for the tile problem. (inaudible) I used to walk out through the, I was tech support, and I'd go out through the OPF, joking with Bill Murphy (phonetic), (inaudible) said (inaudible). In fact, they brought in a special team (inaudible). I think STS4 or 5, and somebody else, I can't recall. But JSC took over the installation of the tile before STS (inaudible). It was essentially out here and (inaudible). So tile is the culprit, but I think there were a lot of people happy that we (inaudible).

DR. ORVILLE BUTLER: One of the things, the Shuttle had been sold to Congress on is its reusability and fast turn around. From what I've heard Kennedy always had a somewhat different take on that, then did JSC or Headquarters. What did you recall?

MR. TOM UTSMAN: Well, I'll tell ya. There's a guy, Jim Hart (phonetic), who was the daddy of the (inaudible), and he was the 160 turn around on paper. Jim Hart (phonetic) last I knew lived in (inaudible). There was a lot of skepticism, but you got to remember the Shuttle vehicle we have, is not the one they based the 160 hours on. So, I think what happened the 160 hours was something that was like, (inaudible). It was (inaudible). I don't remember how fast. I think we got it done in 11 or 12 days – you couldn't do it because the hardware wouldn't support it. (inaudible) Roll it in to the VAB on its own wheels and then you were just gonna take and put the (inaudible) hook it up and put it on.

Well, turns out you can't even hook on to it, you had to put (inaudible), because it would not hold its own weight. (inaudible). It could sit on itself, but you

can't hang it from the hook or anything. If you let go of the bottom, you'll rupture the (inaudible). It's really nothing more than, it's like I was holding an arrow. The arrow had a cap (inaudible). the shaft of the arrow. (inaudible). (inaudible). And didn't start that with me, the concept.

I remember Max (inaudible). (inaudible) as first Director of the Shuttle. He was always arguing for maintainability, and finally, Max (inaudible), the chief engineer in Houston. F-A-G-E-T. Max said, Goddamit (inaudible), if we did what you want, you could take it apart and put it together so damn fast, it would make your head spin. (inaudible) And that was the problem.

Hydraulics – originally we just had a shaft – stick an electrical shaft - (inaudible). So then you had to carry the pump, so they said, well, why don't we just move that outside the vehicles. That's (inaudible). A lot of the ideas that were gonna make them faster never materialized because of the hardware wouldn't support it. But we would have never gotten 160 hours, that's, I think.

Well, there's two (2) things – there was the hardware problem – second one was the atmosphere by (inaudible) recognition that your riding a bomb up there and, so there's a lot of things to be done, hardware wise and procedure wise that (inaudible). But it didn't happen. So.

DR. ORVILLE BUTLER: How did Challenger change things?

MR. TOM UTSMAN: Challenger, I think. Challenger, first of all changed one (1) (inaudible). I think the records. (inaudible) The idea was, were gonna fix it and prevent it from ever happening again. We had management changes.

The biggest management changes, we had been moving as an Agency for (inaudible), and I think the Headquarter manager, I think at that time, thought that things were relatively too easy or safe.

They thought the vehicle was safer than (inaudible). They didn't see the risk. (inaudible). Senators, congressmen, school teachers – you name it, we fly. We had a lady up there that (inaudible). So that level of risk, the level of risk I don't think at (inaudible) at Headquarters. If you yelled at it in the Center – it didn't matter. Center guys were always too conservative.

And so, when Challenger accident happened, all of a sudden the whole atmosphere changed. Before the Challenger accident everybody was on my case about getting a number of people, a number of civil servants (inaudible) and it was too many. In the meantime, we're cannibalizing one (1) vehicle. We got one part that works. We take that out of one (1) vehicle that (inaudible), and put it in the one (1) that's gonna fly and doing that kind of thing. Just wasn't a good operation. So I think what happened was that it was less forward thought to, telecoms weren't quite ready and so I think people were getting a little bit blase' with the (inaudible).

Hell, when it went, blew up, there's no arguing it blew up. Then when we found out, essentially in my view, it was a (inaudible) defect in the solid rocket motor. (inaudible). Anytime in the winter, it was gonna happen, it was just a matter of when. That was sobering, to say the least.

After, before we launched again, Truly (phonetic) was (inaudible) Miami in February, right after the accident. He was brought in, in February of '87 as the

associate space (inaudible), and he had Bob Crippen (inaudible) and he had to set up the managements structures. Get more disciplined. Then the accusations - if I had (inaudible) people, in Shuttle operations, 650 being too many, 850 was just right, so that was. Add people, add operations. Put (inaudible) and took steps for anybody who had concerns before, whether they were rationale or not, they were listened to. That's what happened.

The overall Shuttle budget (inaudible). Three (3) Billion dollars, so we had (inaudible). That was after (inaudible), and so it was a really battle, but that – I don't remember the (inaudible). We had gotten down to where we were launching fairly quickly. I know I was in asked (inaudible) before Challenger – how many a year are you launching – it was how many can you sell. It wasn't a problem (inaudible). 15 or 16 a year. That was a (inaudible).

Weather became much more critical. Not because of anything that happened on Shuttle but we blew up the (inaudible). Spring of '87, no, the following Spring – we had lightening strike the Atlas and that got (inaudible). I was out in the (inaudible). But that (inaudible).

DR. ORVILLE BUTLER: You had lightening strike on Apollo 12?

MR. TOM UTSMAN: Yeah, but that was, we had a understanding, and after that happened, so I don't think that was a concern. We would have not launched. (inaudible) They launched in weather they shouldn't have, but that put the weather people in the spotlight. You put somebody in the spotlight and there gonna find a way to shine. The weatherman doesn't shine, if he says, Go. If he says, Stop,

it's pretty (inaudible), so weather people can be a real (inaudible). But those were the kind of things. (inaudible).

They eliminated the Department of Defense (inaudible). That was the (inaudible) National Policy. They also eliminated the commercial. What was left, was Shuttle. While manifest had been about a third commercial, a third military and a third scientific, but it was also (inaudible) a year. You look at the flight rate (inaudible). (inaudible). It still stayed about a third, a third a third. Well all of the (inaudible) take two thirds (2/3) out of the missions and you have, after a few, after the transition. I mean Shuttle has a pretty limited mission and that's why Shuttle is (inaudible), with Space Station.

They don't fly the Space Station, they don't fly (inaudible). And that came about because of the (inaudible). (inaudible) I asked if they were going to rescind the national policy, probably should and the answer is, until they rescind the national policy that's what it gonna be, and I think that's what it's gonna be, because you got national structure gong on that's what its gonna take to change it.

DR. ORVILLE BUTLER: During that same time period, say '81 to '87, we had virtually done away with the unmanned launch operations.

MR. TOM UTSMAN: That was because Shuttle was to become the single vehicle, (inaudible), to exist in space. Which is (inaudible). And the cost structure that was set up for the Shuttle was unfair, mainly because they rely on Marshall cost, it was (inaudible) they couldn't compete. And then by (inaudible) the same period, when (inaudible) was (inaudible).

Tape One, Side two ended.

DR. ORVILLE BUTLER: (inaudible) is the European?

MR. TOM UTSMAN: But when you look at the launch market for commercial launch vehicles, it an international market and so you get the US market place, didn't have any problems when the Russians (inaudible). They were still behind the iron curtain, so the only competitors they had, was themselves, and they weren't particularly aggressive, so when Shuttle came onboard with this concept, hey, we're gonna launch everything for everybody, so you got to (inaudible) prices. Well, it got the concept of (inaudible) pricing which says, what are my our of pocket costs associated with the launch - not what I've got invested.

I don't have to recover, don't have to (inaudible). I think it's pretty damn cheap. Flying multiple payloads, all of a sudden, you not flying on a taxi, you're flying on a bus, so that was what (inaudible). And then (inaudible) in fact, I saw a gentleman a month ago, who had been in Saudi Arabia, when the (inaudible) had fallen in and (inaudible). And it was a big thing. (inaudible) So, this was the marketing that was going on, so it was. And it went on until it was (inaudible). If you really think, remember I told you, Headquarters thought it was pretty safe.

Well, that goes in because if it's pretty safe or reliable, everybody can fly it. (inaudible). You can essentially drive on it, you can decree that the airports (inaudible), and lo and behold, when the contrary statement comes up. We have (inaudible), we have failure. That just changes that whole atmosphere. So, out of that came essentially the commercial launch vehicles. Got new (inaudible) and military got

their own vehicles. (inaudible) and they went out to new expendables, so it changed the whole industry.

So, it left Shuttle essentially (inaudible), which is science, (inaudible). The early years, the pressure to launch more flights, get the cost (inaudible). Now the pressure is getting the cost down, but no longer is it to launch more flights.

After the Columbia, there are people saying, are you going to fly again. The answer is probably, yes, but the question is, will they build another Shuttle. I don't think so. I think they'll look at it and (inaudible). Columbia was really didn't have much do (inaudible). (inaudible).

DR. ORVILLE BUTLER: How did Challenger and response to Challenger compare with AS 204, the Apollo 1 fire?

MR. TOM UTSMAN: I think the Shuttle was an accident, I think the Apollo fire was (inaudible). You look at it, and I think (inaudible) Thompson ran the investigation for the Apollo 1, and he was appointed by a NASA administrator. He had a Presidential Commission (inaudible). I wasn't in the same position, but I was (inaudible), but I do recall looking at it. There were a lot of changes and things like that. But it was essentially a NASA (inaudible), whereas Challenger was one helluva story. This guy Vince Spezzano (phonetic), (inaudible) newspaper. (inaudible). (inaudible).

First one (1) occurred when the space program was coming (inaudible), this was not something (inaudible), even though it was the first unmanned. It occurred during the Vietnam era. I just think the Nation wasn't (inaudible), (inaudible).

Challenger, we had built up false expectations. We weren't treating it as a research (inaudible). So that what's the President didn't (inaudible).

I remember in light of Challenger, I was asked by a couple other people, (inaudible) to come up with a list of recommendations for the investigation. This was 7:00 at night, bring it in by 8:00 in the morning. secretary says, (inaudible), but it was obvious to me that sometime the night of the Challenger, they decided the White House Presidential Commission, it wasn't (inaudible), so they didn't. Didn't do that in Apollo 1. They didn't do it in Challenger. (inaudible)

DR. ORVILLE BUTLER: What are the other things that (inaudible) talking to people here at KSC, is the most (inaudible) quote, unquote "culture". You've got the launch vehicle people. You've got the space vehicle people, the nose cone (inaudible), where did you grow up in terms of those cultures?

MR. TOM UTSMAN: I grew up as a launch vehicle guy, for when you start working Shuttle, you quickly married. I think that the two (2) cultures were (inaudible) culture. Then when I worked the (inaudible). Also design engineering was separate culture. Tech support had a separate culture.

DR. ORVILLE BUTLER: How did design engineering and tech support differ from the OPS people out at the pad?

MR. TOM UTSMAN: Well, the tech support people, when I was there had a very (inaudible). Example being, if you looked at how they serviced customers who had requested (inaudible). But, when they get a request, they say, no, we can't do this and then later on (inaudible). That permeated the whole organization.

We got so much to do in here, we can't do this, but when you looked at the numbers, they could all (inaudible). So when I became the chief I told them, tell them, yes, and if there's a problem, call them back, but count on it and I'll get back with you in a couple hours if we can't do it, otherwise we become a can-do organization. (inaudible)

Second problem is they had (inaudible), 3,000 support contractors, but to get into the computer center, the contractors hardly were (inaudible). So you had the change the attitude from the civil service toward the contractor, so that was two (2) cultural changes.

Design engineering we had a very similar culture coming out of the (inaudible), and I think that came about from, they didn't have that much to do. They became (inaudible). Every job they did was so huge, nobody could (inaudible) one thing at a time, and so the Shuttle, when it came to the Shuttle, (inaudible). (inaudible). So, it was a fairly (inaudible). (inaudible). Tech support and it had raised its (inaudible) of tech support was least like these other (inaudible). Most overpaid bunch of people (inaudible). (inaudible). (inaudible). It's one thing if you tell somebody, hey, I'm gonna do it and (inaudible). (inaudible).

The OPS guys, by the time I got to Operations, I had always had the impression that the nose cone (inaudible), but when I was working for them, (inaudible). I had (inaudible). George Page was (inaudible), so I don't think it ever (inaudible). A lot of it was the personification of what Centers (inaudible).

The launch vehicle people were (inaudible) at Marshall and they came by the pad and German personification, and those (inaudible) were (inaudible) by KSC

headed up by the American (inaudible). You got (inaudible). So I think there was a reflection of some form of leadership (inaudible).

DR. ORVILLE BUTLER: What about the major contractors. They too would have corporate cultures. How did you assess the major contractors from the Shuttle, or if you want to, go back to the Apollo?

MR. TOM UTSMAN: No, no, Shuttle. Well, Rockwell had (inaudible). (inaudible) was a character. I don't think (inaudible). He was very disciplined. He ran an organization that was very sure of themselves. The (inaudible) (inaudible). Then there was Martin - had Tom Worth (phonetic) and Tom had once played football for Vince Lombardi and he had Vince Lombardi's (inaudible). I know when I put him on a center contractor, he screwed the shoe. His whole plan was (inaudible). His people.

The weak sister was the booster guys. They never really, they tried it with (inaudible). They just wasn't the same company. Then again it was the weakest (inaudible) and they didn't (inaudible). Marshall was eventually (inaudible), but the other had a (inaudible) culture and Martin was Martin - you meet your deadlines, so they were (inaudible). But they were (inaudible).

I think that attitude carried over to Shuttle processing. I was not the (inaudible). The first I heard about the (inaudible) was when it went to Headquarters and I sat through it. I was used up my (inaudible). (inaudible). (inaudible). And what they did was, their all drawing pensions and (inaudible). In fact, Peter (inaudible) say,

drunk venture only, purpose of drunk ventures are (inaudible) you can't operate, so that's what broke 'em. So they got a convoluted managers, no real (inaudible).

DR. ORVILLE BUTLER: (inaudible) Lockheed?

MR. TOM UTSMAN: No, this was incumbents. Martin, Rockwell, Boeing Services International and two (2) others, oh, SCS, I guess Boeing (inaudible). So all the incumbents, the major companies joined together for a joint venture and they brought in Rockwell, but they got Martin, who shares in the business. They assume they've won, it was part of their culture.

For example, Martin said, I have the west coast, so they were gonna take the Air Force operations. The contract was (inaudible). And our scheme had always been, it would send a crew out to the west coast early on to launch the first vehicles that had experience. I mean, it's the same flight hardware, so you look at (inaudible) you got to reduce your risk, you send a cadre of people (inaudible), That's what we do in expendable or (inaudible). And that wasn't to be because Martin had to have its share of the first (inaudible). That was their territory, so the top managers came in and took it away. (inaudible).

And the Board did something I thought was (inaudible), rather than just saying the government's board viewed it that way, they went to Peter (inaudible), there was a guy Jones, Reginald Jones who was (inaudible) CEO of (inaudible). And then they had a guy, George Lowe (phonetic) who was a Deputy of the agency, Deputy (inaudible) who was the President of (inaudible). They had them look at the management (inaudible). All three (3) of them said it was (inaudible), so it wasn't just

the Government. It reinforced what the Government (inaudible). That was how the culture (inaudible).

DR. ORVILLE BUTLER: So how did the incumbents respond to that, did they go about changing anything?

MR. TOM UTSMAN: No, they were out. They no longer had a job. (inaudible) The guy they had running for (inaudible) was really good. He later on became President of (inaudible). There were a lot of folks who knew what was happening, but there was nothing they could do because corporate got very involved and their corporate culture took over.

DR. ORVILLE BUTLER: Okay, what are the things that happened when (inaudible) came along when JSC got control of the contractor for Shuttle?

MR. TOM UTSMAN: They got, originally they (inaudible), and the orbiter and the operations (inaudible). They got the integration. They were asked to be the integrator contractor and they had a guy, Bob Thompson (phonetic) because somebody has to do it. And the feeling was that Headquarters didn't have the technical (inaudible), so JSC stepped up. I don't know anybody who doesn't. (inaudible)

Dr. Bob Thompson (phonetic) who is probably the fairest man in the free world. He did more the KSC than (inaudible). People talk about, he's the one that Apollo, the automatic check out (inaudible). (inaudible). With KSC control. JSC had competing (inaudible), Bob Thompson looked at the situation and (inaudible) the processing system. Most of (inaudible) the JSC to KSC, he did. It wasn't JSC's decision.

It was not made for JSC because they lost a lot of business, but it was made for what he thought was, the good of the program.

I was (inaudible). So once they had that, the engineering support guy, the guy that ran integration would be the orbiter. Then the orbiter was JSC's. The engines were Marshall, the tank was Marshalls, the solids were Marshalls, the propulsions were (inaudible). (inaudible) the tank, it was decided was (inaudible), part of the propulsions, and so it followed pretty much what it (inaudible).

Out of Shuttle, KSC got a much bigger role. Much bigger in the sense of ground support. (inaudible) Primarily on Apollo (inaudible). The scheme was, in Apollo and early Shuttle, the same was that the contractor that developed the hardware did the processing. I think that, I hope I never have to think about how (inaudible). I know the Shuttle processing contract made sense. I don't know if the new (inaudible) whether it would make sense or not. That's just. I haven't spent enough time (inaudible).

DR. ORVILLE BUTLER: In general how did you see the relationship between the Centers and between KSC and Headquarters? You were on both sides of the fence then.

MR. TOM UTSMAN: Well, there's a tough (inaudible) between the Centers. I guess you'd always expect that tension and it mainly came because KSC operators (inaudible).

DR. ORVILLE BUTLER: You're talking about the relationship between the Centers?

MR. TOM UTSMAN: Yeah, I think there's always a tension but I think it comes because of the goals. KSC's an operator. The other two (2) Centers are development Centers. And if you look, it's not a heck of a lot different if you go and you're building an airplane. The airlines have a tension and that's who building a airplane. There's always someone with different set of prospectives. Like I said earlier, the operators, they're looking at how you make (inaudible), or how you make it operable.

Developers are saying how in the hell am I ever gonna get this thing to work. (inaudible) So you, (inaudible). That will prevent some of that. That will reflect (inaudible) cultures. The thought is that Headquarters is not capable of doing anything. And that's a well thought (inaudible), and therefore, it ought to be (inaudible). It ought to be objective in its decision making and keep Congress (inaudible), or at least orchestrate it. The problems that really incur on things, when they get into the lead Center concepts.

I've told you I thought Tom Thompson (phonetic), the first Shuttle Program Manager was fair. Now, and if you put one at KSC, he had the impulses of the Center Director. I don't care how you (inaudible).

So, I think Headquarters always has to be in charge of running (inaudible). If Headquarters is in charge of (inaudible), (inaudible), (inaudible). Why did you give that kid 50 cents, and me only 40, so that creates those kind of tensions. As I told you earlier, John Yardley (phonetic) used to say, are the bastard still lying to ya?, and I'd say, yes, John, because Headquarters always believes the Centers are

lying, the Centers are trying to pad their own pockets, and they always want more than they really need. So you get all this tension.

I know there's been a lot made of this business about Columbia, about NASA's culture and other (inaudible). I don't mind cultures, not too hard to understand, I think we probably, the work will probably have to put in (inaudible). (inaudible).

DR. ORVILLE BUTLER: (inaudible question) I always (inaudible) it was cosmetic.

MR. TOM UTSMAN: No, if you dealing with cultures, cosmetics are important. When you really get down to it, you're dealing with what the people believe (inaudible), and so even through it looks maybe cosmetic, the Agency gets to be important for (inaudible). You look at a Center. A Center has folks (inaudible) what goes on there. (inaudible) and visa versa. Headquarters have a good (inaudible). So I think if you do some cosmetics, may not be anymore than cosmetic, it gets to be significant, so I think (inaudible). (inaudible). (inaudible). (inaudible).

About three (3) years ago, this lady wrote on the Challenger publishing (inaudible). Anyway, I think she was about right on. She claimed the Challenger was an institution, and she's right, it was. Somehow changing, cause when I went to graduate school, they said the hardest thing to do was change cultures. (inaudible) Pull up your socks, grab your lunch pail, let's go, it'll take you three (3) years (inaudible). I don't think it got three (3) years, I think a lot of it will appear (inaudible). (inaudible)

DR. ORVILLE BUTLER: You mentioned the sociologist, I can't remember her name either. (inaudible) Challenger, do you think something similar was the case for Columbia?

MR. TOM UTSMAN: I think so. I really think Columbia was again, an institution. I didn't think so at the time, but I do now. (inaudible) it is (inaudible), so I had a hard time (inaudible), but the problem, why didn't, or why wasn't (inaudible). It's an institutional thing. (inaudible)

DR. ORVILLE BUTLER: Well, we've gone way over our hour.

MR. TOM UTSMAN: Well, all I got to do is play chess this afternoon.

DR. ORVILLE BUTLER: I've got another interview coming up, so I'd like to ask you some more questions - Maybe we can do that some other time.

MR. TOM UTSMAN: All right. It's your call.

DR. ORVILLE BUTLER: If we come up with more questions to ask, we'll give you a call.

MR. TOM UTSMAN: All right.

Thereupon the interview ended.